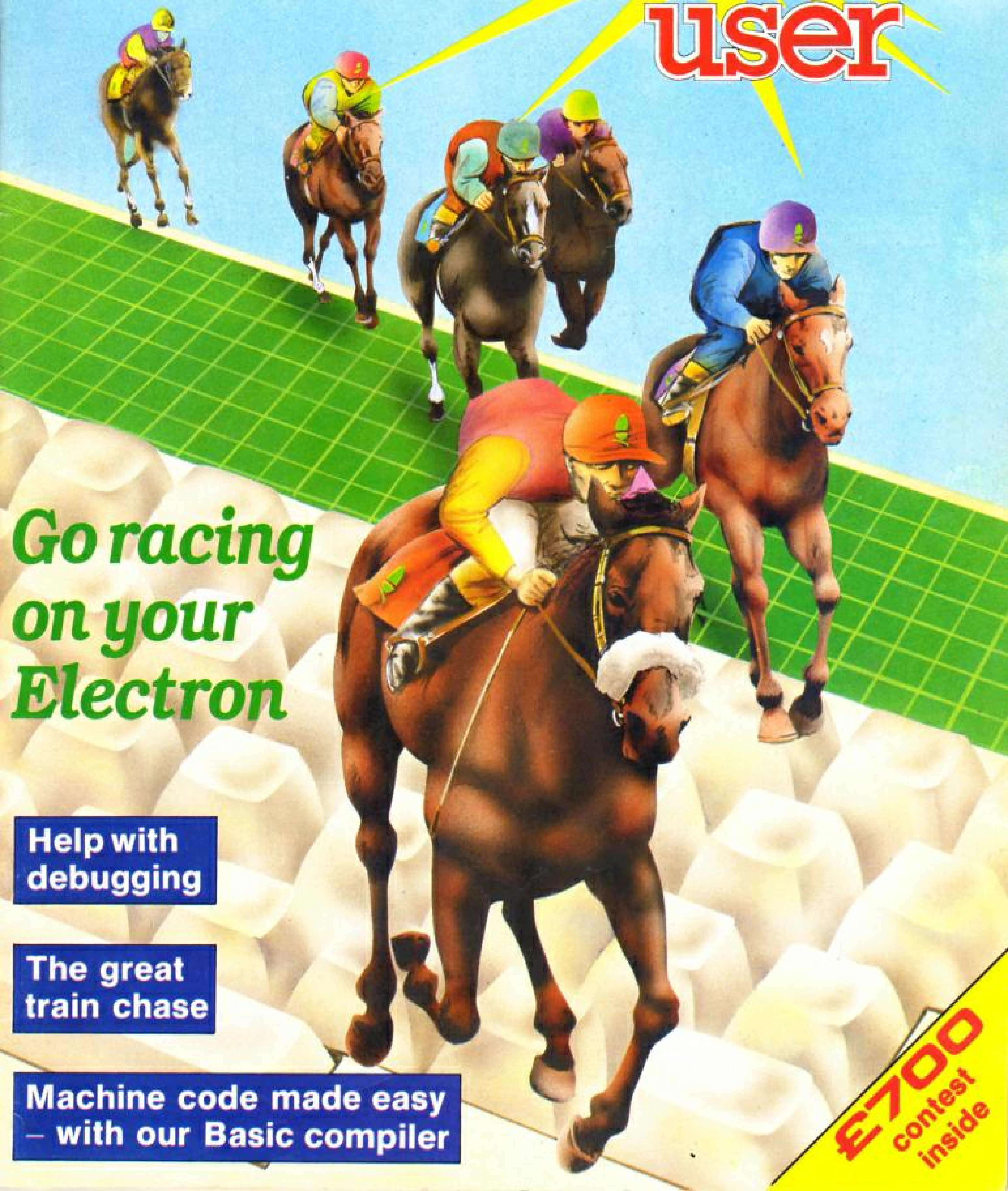
A Database Publication

electron user

Vol. 4 No. 2 November 1986 £1



Go racing on your Electron

Help with debugging

The great train chase

Machine code made easy – with our Basic compiler

£700 contest inside

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THRUST

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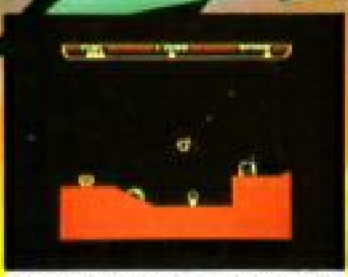
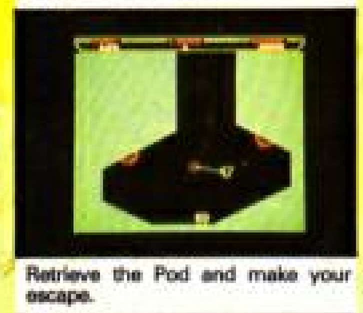
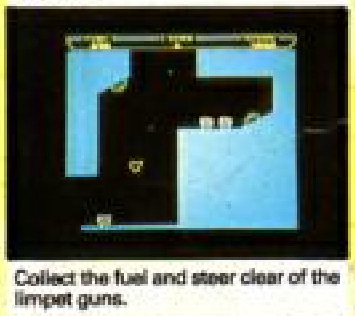
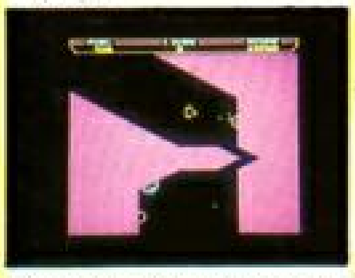

The first mission — destroy the reactor for a bonus score.


Retrieve the Pod and make your escape.


Collect the fuel and steer clear of the limpet guns.


Shoot the activator to open the sliding entrance door.

REVIEWS OF THRUST ALREADY PUBLISHED

Zzap! 64: "The most enjoyable game we've played for ages . . ." — A ZZAP! SIZZLER.

Computer & Video Games: "Thrust is a simple but totally addictive game . . ." — A C+VG HIT!

BBC MICRO

ELECTRON

Now available for the BBC Micro and Electron

The Commodore-64 version of Thrust (published by Firebird Software) shot immediately to No.1 in the software charts and was greeted with rave reviews throughout the computer press. Equally addictive and just as enjoyable, the BBC Micro and Electron versions of the game are set to emulate this performance.

Thrust is simple, fun-to-play, yet totally realistic and intensely challenging. Your mission is to visit 24 planets in turn collecting the Klystron Pods and, if possible, destroying each planet's reactor system. Your spaceship and the pods, which are heavier than the spaceship, move authentically subject to the laws of gravity, inertia and momentum — indeed the game's author, Jeremy Smith holds a First-Class Honours degree in Physics! Careful planning of your manoeuvres is essential in order to prevent the pods swinging out of control and dragging your spaceship to destruction.

To add to the challenge, the planets have different gravity rates and, as you progress through the game, some have "reverse gravity" or "invisible landscapes". They are defended by automatic limpet guns strategically placed to protect the pods and fuel tanks — the only source of replenishment for your limited fuel supply. The smooth screen-scrolling, which is exemplary, and the realistic action gives the player a fascinating feeling of floating through space.

PRICE: £7.95 (cassette), £11.95 (BBC disc)

COMPETITION COMPETITION COMPETITION COMPETITION

If you complete the mission by collecting the pods from all 24 planets, you can enter our competition. The prizes include the beautiful trophy (pictured on the right), **£250** cash, and 3 copies of the captivating book **"The New Atlas of the Universe"** by Patrick Moore. Closing date: 31st January, 1987.

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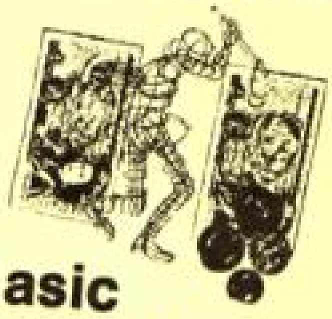

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Electron User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

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electron user NEWS

November 1986

Sealed lips to repel pirates

MORE than half the leading firms exhibiting at this month's Electron & BBC Micro User Show in London say they will bring along new products for the Electron.

But they are keeping their cards close to their chest regarding details about several major developments.

In the past suppliers have been open and forthcoming about new products in the pipeline.

But this year has seen an increasing reluctance to talk about software and peripheral developments before they are ready to go on sale.

"The reason is quite simple – too many firms are getting ripped off by pirates operating in the budget end of the market", Adrian Kearney of Slogger told *Electron User*.

Stealing

"If we announce our plans early, or demonstrate modules under development, we run a real risk of pirates stealing our ideas".

Barry Rubery of Pace said: "The situation has been getting worse since 1984 – it just doesn't pay to give out too much information in advance about a new product".

However, *Electron User* has been told that there should be at least

Turn to Page 6

Give your Electron power of IBM

A LEADING software systems house wants Electron users to help it adapt a program that will give the machine the power of an IBM PC at little cost.

Minerva Systems has revealed that its relational database program System Delta will run on the Electron.

The firm, which launched the powerful and sophisticated program for the BBC Micro earlier this year, told *Electron User* that, "subject to Mode 7 constraints, System Delta will run on the Electron".

This revelation potentially places the Electron in the same league as the IBM PC regarding database software, since System Delta is claimed to be as powerful as dBase II, the popular PC systems package costing several hundred pounds.

System Delta combines the complete flexibility of a relational data handling system with an in-built BBC Basic gateway, enabling BBC Basic and simple code programs to be called from within the Delta package itself.

In doing this, Delta emulates the "programming language" concept pioneered by dBase II, allowing a flexible database program for almost any application.

Features such as screen panning in both vertical and horizontal directions, as well as windowing on virtual screens within memory, allow Delta to be used in major database applications.

Technically, System Delta is a true relational database management system comprising a 16k eprom written in machine code as an extension of BBC Basic.

This allows a program to be written and saved for future use.

Over 150 commands support data handling, including open files, get records, find and edit commands, as well as general routines for prompt lines, menu selection and scrolling cards.

To support the package, Minerva has produced a 160 page reference manual, and several customised applications including hotelier, estate agent, school administrator, and estate agent modules.

And the price of this powerful package for the BBC Micro – £64.95 for the basic package, with a modest surcharge for vertical market application packages – is expected to be the same for the Electron version.

But Minerva says it needs to talk to Electron owners before it completes development of a version of System Delta for the Electron.

"We will welcome approaches from Electron owners regarding System Delta so we can customise the program for their applications", a company spokesman told *Electron User*.

MICROLINK GOES INTO EUROPE

ELECTRON users can now have instant access to Europe's most influential database – thanks to a new permanent electronic link to Luxembourg.

It has been set up by MicroLink in conjunction with the EEC's Directorate General for Information Market and Innovation.

The venture provides a direct link between the main MicroLink computer and that of Euronet/Diane, which is part of a far-reaching project by the European Commission to create a "Common Market of information".

It means that MicroLink now has access to more than 600 European databases.

Databases that now become available, through the European link, to Electron owners who subscribe to MicroLink, contain information from many sources not available through any other on-line host.

Multilingual

They range from information on research projects, reports and organisations to an on-line directory to help find the right hardware and software.

Among the facilities on offer is a multilingual terminology databank of scientific and technical terms.

It contains more than 380,000 words and phrases and over 90,000 abbreviations and is updated at the rate of 2,000 new items a month.

The Luxembourg connection follows closely on MicroLink's other recent major achievement – the world's first transatlantic link-up with giant American database Mnematics.

"Our latest venture will prove invaluable in opening up new telecomputing opportunities in Europe", said Derek Meakin, head of MicroLink.

Who'd like to play Scrooge?

ENTERTAINMENT with a dash of culture is the recipe for a new range of programs for the Electron from Riverdale Software.

Starting this month the firm will be releasing a series of text adventures based on classic novels.

The first is Charles Dickens' A Christmas Carol in which the player takes the part of Scrooge.

Also scheduled for release before Christmas is Oliver Twist. Again the player takes on the role of the main character, and Riverdale promises that Fagin and Bill Sykes will be "even more dastardly" than they were in Dickens' original.

Encourage

Because of the length of the adventures they will come in four parts on one tape. Price £4 each.

Riverdale spokesman Charles Lomas told *Electron User:* "These programs will have an educational as well as entertainment value – we hope they will encourage people to read the novels after they have played the games".

Keeping it all in the family

THERE'S a family atmosphere about Code Masters, the new Electron budget software house.

Its managing director is Jim Darling, formerly boss of A I Products – the company which wrote Mastertronic's software.

Working alongside him are his sons David, 20, and Richard, 18, award-winning programmers whose games have sold in excess of a million copies.

The Darling brothers' prodigious range includes The Last V8, Master of Magic and Games Creator for Mirrorsoft.

"All our games will be top quality but will only cost £1.99 each", Jim Darling told *Electron User.*

"We have targeted the Electron because feedback from retailers tells us there is an undercurrent of demand for Electron products that is far from being satisfied.

"We intend to have several Electron games on the market before Christmas".

Jim Darling with sons David and Richard

SHOW RECORDS SMASHED

PREVIOUS attendance records were smashed when the Electron & BBC Micro User Show paid its annual autumn visit to UMIST, Manchester.

And it was the enthusiastic legions of Electron users who tipped the scales for a fantastic turnout.

There were queues round the Renold Building long before the doors opened on Friday – and the crowd scenes were repeated throughout the remainder of the weekend.

All of which was great news for the more than 50 leading firms who exhibited at the show and who, in most cases, reported bonanza takings.

One firm, Pace Micro Technology, sold out its stock before the show was half way over and had to rush additional supplies from its Bradford base.

Similar success stories were recorded by many other exhibitors.

Despite competition from its BBC big brothers, some spectacular new Electron products were announced.

Bearing witness to the growing army of Electron owners, the number of new products for the machine almost exceeded those for the BBC Micro and Master series.

Top Electron add-on supplier Slogger unveiled two major new products – Turbo Driver and Master RAM board. Turbo Driver speeds the Electron's cpu considerably, giving it the same power – excluding Mode 7 – as the BBC Micro.

It retails in kit form at £29.95, £49.95 if fitted at Slogger's factory.

Master RAM board at £39.95 offers the same facilities as Turbo but with the added advantage of giving the Electron a further 32k of shadow ram, raising the cpu's speed by as much as 300 per cent on graphics operations.

Permanent Memory Systems showed its second-processor reliant Wordwise Plus for the Electron. It goes on sale at around the £35 mark, according to PMS's Gordon Cameron. PMS was also offering its E2P second processor at £89.95.

Norwich Computer Services' Paul Beverley, whose firm exclusively produces Wordwise Plus support programs for the BBC series, expressed great interest in PMS's new program.

"It represents a major step forward in Electron programming terms, proving the Electron every bit as powerful as its big brothers", he said.

"I will be looking very closely at bringing out a complementary series of Electron Wordwise Plus programs before Christmas", he added.

Electron to the rescue

AN ELECTRON has saved a private bird sanctuary in the north of Scotland from being forced out of business.

Run by husband and wife team David and Kathleen Peters near For William, severe cash shortages threatened its survival.

Then David risked their last £100 to purchase an Electron and software to run a charity appeal.

So successful has the micro been in running the operation that the sanctuary is back in the black for the first time in four years. "We had tried it before by doing a mail shot by hand, but we never really had the time to do it properly," says David. "But the computer has made all the difference".

Now the couple who look after literally hundreds of injured birds each year can carry on.

Repelling the pirates

From Page 5

50 new add-ons and programs for the Electron at the show, which takes place at the Royal Horticultural Hall, Westminster on November 7, 8 and 9.

One of them is the new Business Payroll package from Micro Aid which computes employees' wages and deducts National Insurance and tax. Price £29.95.

Centec will be selling a bargain pack of ten 3.5in discs at a special show price of £13.99.

And Shards Software has promised a unique competition in conjunction with its Electron adventure game Operation Saras which will also carry a special show price.

New products for the Electron and bargains galore for pre-Christmas shoppers are likely to guarantee another record breaking turnout at the show where more than 100 leading suppliers and manufacturers have taken stands.

Three newcomers from Potter

THREE new software bargains for the Electron have been released by Potter Programs.

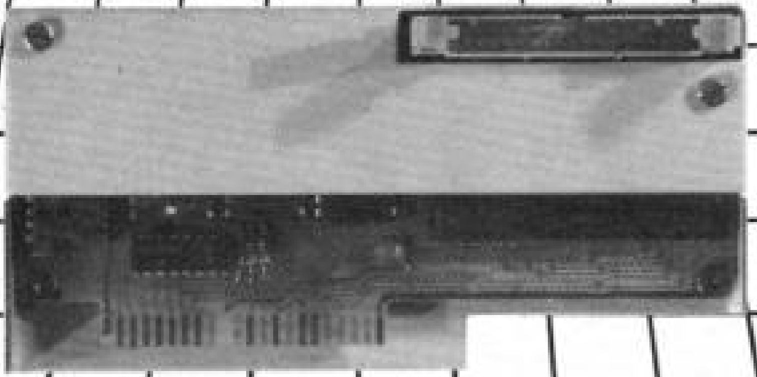
Bridgemaster is a machine code simulation of the compulsive card game, suitable for beginners and experienced players alike.

A comprehensive bidding system, competitive playing algorithm, high resolution graphics and player interaction are features of the game.

Arcade 4 Pack includes The Three Crystals, Yartsie, Fruity and Hunchback.

Adventure 4 Pack includes Inner Space, Hexagram of Trutania Valley, Stranded on Iloofrax and Philosopher's Stone.

Advanced Computer Products



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ELECTRON USER, JUNE '86

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"The AP4 should be considered the standard interface for the Electron". **Acorn User, July '86**

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When you're cleaning windows

Part nine of the Electron graphics series by TREVOR ROBERTS

HANDS up all those who don't understand how:

```
VDU 28,bottomx,bottomy,
topx,topy
```

and:

```
VDU 24,bottomx;bottomy;
topx;topy
```

can be used to create text and graphics windows. If you don't follow that then you'd probably better re-read the September and October articles.

If you do, however, you'll no doubt recall how we can join the text and graphics cursors with:

```
VDU 5
```

and "unjoin" them – if there is such a word – using:

```
VDU 4
```

When you're sure that you remember all that, read on and have a look at another useful aspect of VDU 5.

You'll recall that setting up a text window confines all subsequent text to that window. Any attempt to get text on the screen outside it with TAB fails miserably.

In the normal course of things this is fine. After all, you create a text window because that's where you want your text to appear.

However, at times you'll find that you want to have text outside the text window.

For example you may want to label the axes of a graph. Rather than mess about defining different text windows, you can use VDU 5 to help you place it outside the window.

To see this, first of all create a text window with:

```
VDU 28,4,20,15,10
```

and try typing in some letters to convince yourself that you really do have a text window measuring some 12 character spaces across and 11 down.

Now suppose that you want to place a character on the screen outside this window. Try as you like, TAB won't help, it sticks rigidly inside the text window. You need VDU 5 as you'll see if you enter:

```
VDU 5:MOVE 64,64:PRINT "!"
```

This joins the text and graphics cursors, moves them to a point just in from the bottom left of the screen and prints an exclamation mark.

Once you've recovered from the excitement of no longer being confined to your text windows have a go at running Program I.

All this does is to demonstrate how the screen scrolls to make room for more text when it's full. This is something you've already come across and probably take for granted.

```
10 REM Program I
20 MODE 5
30 FOR loop=1 TO 100
40 PRINT "SCROLLING"
50 PRINT
60 NEXT loop
```

Program I

Well don't take it for granted when you've used VDU 5 or you may get some very peculiar looking screens as you'll see if you run Program II.

What's happened is that the VDU 5 switches off the scrolling mechanism. As soon as the screen is full, the micro starts printing at the top of the screen again.

> **‘New text merges horribly with old text to produce an incomprehensible mess. So beware.’**

This might be alright if it cleared the screen first but it doesn't. New text merges horribly with old text to produce an incomprehensible mess. So beware.

If you want to convince yourself that it really is VDU 5 that's responsible, try adding a line like:

```
10 REM Program II
20 MODE 5
30 VDU 5
40 FOR loop=1 TO 100
50 PRINT"THIS IS"
60 PRINT"NOT SCROLLING"
70 PRINT"AT ALL"
80 NEXT loop
```

Program II

```
75 IF loop=50 THEN CLS:VDU 4
```

which should convince you.

Still with Program II, have you noticed anything odd about it? It's supposed to print out the message:

```
THIS IS
NOT SCROLLING
AT ALL
```

yet if you look carefully the first

→

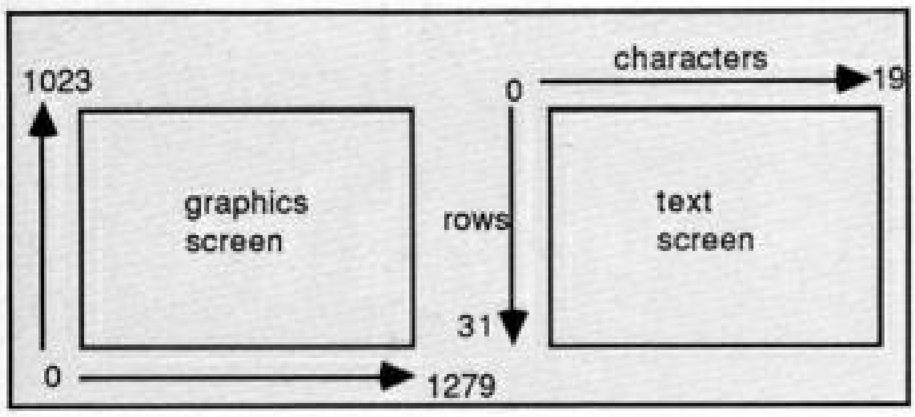


Figure I: Mode 5 text and graphics screen

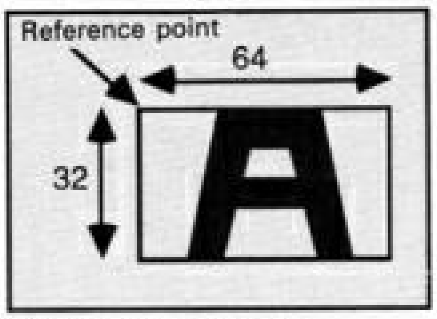


Figure II: Character cell measured in graphics unit

From Page 11

message you see at the top of the screen is:

```
NOT SCROLLING
AT ALL
```

The initial part seems to have disappeared the first time round the loop. So what's happened to it?

To find out, add:

```
75 END
```

to the program which will cut it off after one cycle of the loop. Now look carefully at the bottom of the screen.

You should see some bits of white. These are the tops of the letters of our missing text, mute evidence of VDU 5's effects.

What's happened is that the VDU 5 of line 30 has joined the text and graphics cursor. The program then enters the FOR . . . NEXT loop and comes to the first PRINT statement.

And as a VDU 5 has been issued, it attempts to PRINT at the graphics cursor.

At the start of the program the graphics cursor is at 0,0 – the top left corner of the display. Figure I should refresh your memory on screen co-ordinates.

It's here that the Electron prints the message. The trouble is that the PRINT of line 50 takes the 0,0 as referring to the top left point of the first character cell of the message. Figure II shows this.

The fact that each character cell is 32 graphics units deep is blithely ignored and so only the top bits of the letters appear. The rest are lost below the bottom edge.

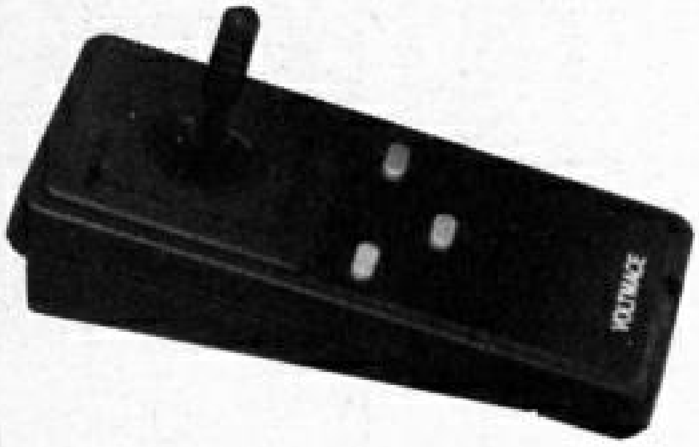
The result is that the first line of the message effectively disappears the first time it's printed.

You can remedy the situation with a line like:

```
35 MOVE 0,1023
```

which puts the graphics cursor at the top of the screen right at the start of the program. Now the whole message appears.

● *And if you've got that message, there'll be more next month as we continue our graphics adventures.*



Transported into tedium

Program: Galactic Patrol
Price: £1.99
Supplier: Mastertronic, 8-10 Paul Street, London EC2A 4JH. Tel: 01-377 6880

AS commander of a starfighter in the galactic patrol your duty is to transport colonists to other planets. Behind this clichéd theme lies a truly appalling program.

The action is divided into four sections. In stage one a horde of alien spaceships attack the colonists as they flicker across the screen to the transporter. The aliens initially appear as small red dots on the horizon, but steadily grow into flying saucers.

You control a photonic lance with your cursor. While the aliens are still dots the cursor moves slowly, but once they have developed to full size it slows to a snail's pace.

The photonic lance uses the DRAW command to connect two points on the screen at which point the alien vanishes – talk about special effects.

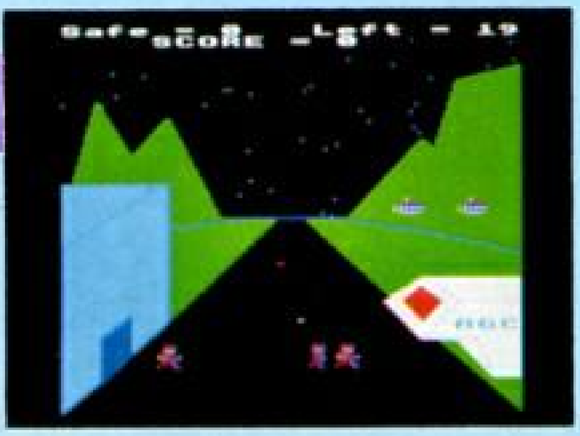
Stage two sees the transporter on its journey and the aliens have taken to ramming tactics. You must protect the transporter by shooting the spaceships before they get too close.

Once again we have the growing dot routine and the corresponding decrease in speed. Having spent a predetermined length of time potting aliens and cursing the ship's movement, stage two ends.

In stage three the transporter runs out of energy so you must dock to replenish its energy banks. I spent ages unsuccessfully attempting to delicately balance my starfighter on the nose of the swerving transporter.

Finally I decided to abandon subtle strategy and simply ram the starfighter into the belly of the transporter – hey presto I had docked.

Stage four involves avoiding the starfleet force walls which move outwards from the middle of the screen,



growing progressively larger.

Despite being warned about the deadly red searcher – a block of corrupted graphics which slowly trails you – I flew straight through it twice and the collision detection routine never even spotted me.

Galactic Patrol is less than impressive. If it is given away with cornflakes I suggest you buy another brand.

Jon Revis

Sound	*4*
Graphics	*2*
Playability	*1*
Value for money	*0*
Overall	*2*

Not championship material

Program: League Challenge
Price: £2.99
Supplier: Atlantis Software Limited, 28 Station Road, London SE25 5AG. Tel: 01-771 8642.

Have you got what it takes to mould a bottom of division four football team into a first division world beater? If you want to find out you'd best practice on League Challenge from Atlantis for starters.

First you must decide which of the 64 teams to manage. This decision is not too difficult once you realise that the squad you begin with is always the same, regardless of the team's name.

The only variables are the individual player's skill and fitness factors. These are generated randomly each time the program is run.

Having selected your team the mid-week options are displayed. Option one lists your players, their skill and fitness, whether they are selected for the team and their position, either defence, mid-field or attack.

Option two allows you to sell your players – I sold every one and still managed to put two goals past Reading! Other mid-week options allow you to rename your team and save the game to tape.

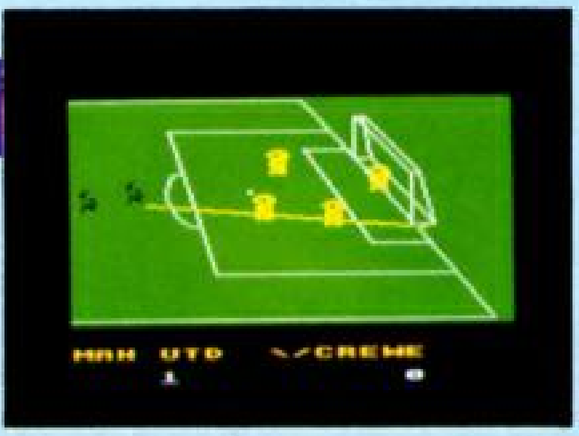
It is now time to get down to some training, and the harder the schedule you select the more it costs. Training will only improve a player's fitness, it will never alter his skill level.

You first play either a league or cup match. Both your own and your opponents skill and fitness levels are indicated.

This provides an indication of your chance of success. If things are looking bad you can always select the change team option and make a few last minute replacements in the weaker areas.

Once you are satisfied with your selection you can play the match. This involves sitting back and watching what could loosely be described as goal mouth action. A few little cartoon characters flicker round the screen and the ball appears in the back of the net – hardly nail biting stuff.

The results of all other matches in the



division are then displayed followed by the updated league table.

The only opportunity available to improve your ailing team is when the transfer market information appears on the screen.

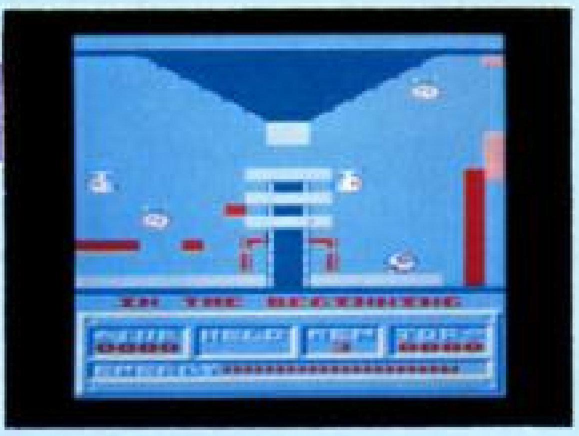
You are offered a single player after each match. If he's no good then that's tough and you'll just have to struggle through another match.

League Challenge is being sold as a budget game but I would still think twice about paying £2.99 for it.

Steve Brook

Sound	*0*
Graphics	*3*
Playability	*6*
Value for money	*4*
Overall	*4*

Ordeal of the Ordanoids



Program: The Last of the Free
Price: £7.95
Supplier : Audiogenic, 12 Chiltern Enterprise Centre, Station Road, Theale, Berks RG7 4AA. Tel: 0734 303663

FOR many years the Ordanoid droids toiled to maintain the machinery left on distant planets by colonists from Earth. Then scientists developed a superior design of robot called the Proleoid, but instead of supervising the work of the Ordanoids they started to destroy them.

Clement is the sole remaining Ordanoid and he must make a last ditch attempt to find the planet's teleport system and warn Earth of the Proleoid problem.

The Last of the Free is a ladders and levels game in which you control Clement on his courageous mission.

Control is simple – left, right and jump will get you around quite nicely.

The backgrounds used are graphically simple but complex in construction. As well as the electrified floors and sliding barriers you must also negotiate the numerous Proleoid droids which infest the rooms. These are drawn in more detail than the backgrounds and are well animated.

Some of the droids which move in mid air have flat heads, and these can be used as lifts if you time your jump correctly and then walk at the same speed as the droid.

The status display at the bottom of the screen gives information regarding energy level, lives remaining, what you are carrying and scores. I was pleased to find that the design of this display was far superior to that of the version for the BBC Micro.

As you play the game you will notice that you are initially confined to two or three screens as your progress to the higher levels is blocked by various doors.

A picture of the necessary key is drawn on each door, a great help as you can only carry one item at a time.

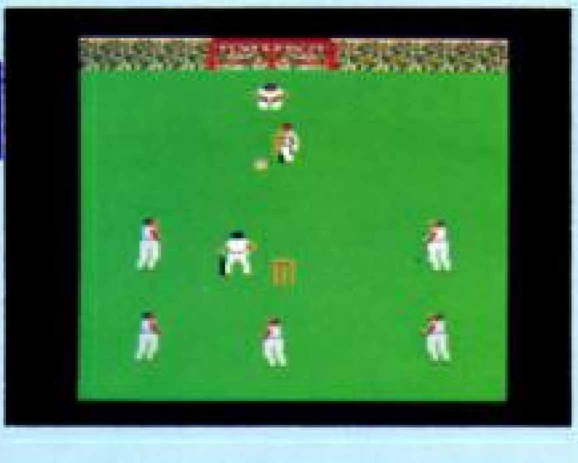
You begin the game with five lives. There are no time bonuses or penalties so you can take as long as you wish to pick a route through a screen. You can fall from any height without incurring any damage, which is very useful as it is easy to lose your footing when attempting a difficult leap between platforms.

The Last of the Free is graphically simple but the routes through the screens are cunning. It will never be a blockbuster but it should still keep the kids amused for days.

Carol Barrow

Sound	***6***
Graphics	***7***
Playability	***8***
Value for money	***7***
Overall	***7***

It's just not cricket!



Program: Cricket
Price: £2.99
Supplier: Bug-Byte, Liberty House, 222 Regent Street, London W1R 7DB. Tel: 01-439 0666

CRICKET is a game which countless programmers have attempted to computerise but failed miserably. This offering from Bug-Byte is yet another such failure.

The game can either be played by two humans or as a man against machine contest. You can also decide whether to play over 10, 20 or 40 overs. The screen displays a view of the cricket pitch along the wicket from the bowler's end. The characters are large, chunky, and consist of four fielders, two batsmen, the bowler and a wicket keeper.

When playing against the computer you will always bowl first. You position the bowler behind the wickets and press the Spacebar. He will then pitch the ball at the batsman who will invariably hit it.

You are allowed a choice of three types of bowler – slow, fast, and spinnner. A spinner will curve in flight as would be expected. However, it also curves when hit by the batsman and when thrown at the wickets by the bowler – odd eh?

When the ball has been struck it will be fielded by one of your carefully positioned team mates. He then throws the ball back to the bowler. If the opposing batsmen have not finished running you can throw the ball at the far wickets. Should the ball strike the stumps before the batsman has reached the crease then he is out.

One annoying feature of the game is the way that if batsman and ball reach the wickets at the same time he will turn around and hit the ball. It's as though the program thinks you have just bowled a new ball.

While on the subject of irritations, on numerous occasions when the ball was being fielded the display reverted to the scoreboard. Pressing "C to continue" from the scoreboard allows you to carry on from the exact point at which the game was interrupted. Why this happens is a mystery to me.

The next bug came to light on my turn to bat. I struck the first couple of balls that were bowled my way and the bowler seemed to lose interest. My partner and I kept on running and nobody stopped us. Eventually I stopped and waited to face another ball but no amount of key pressing could coax the bowler back to life.

Without the bugs the game would have been nothing special, with them it is a complete washout.

James Riddell

Sound	***3***
Graphics	***5***
Playability	***4***
Value	***4***
Overall	***4***

Gala is a force to reckon with

Program: Galaforce
Price: £7.95
Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.
Tel: 0532 459453

WAR has been declared upon the aliens of the Megellanic galaxy. As one of the federation's more experienced pilots you have been enlisted to fly with the elite Galaforce. Have you got what it takes to defeat the Magellan hordes single handed?

Galaforce is an arcade game which bears a strong resemblance to that classic Zalaga – swirling clouds of aliens just begging to be zapped. Zalaga owners should not be put off by this as the game has much more variety and the animation is fractionally better.

Some very impressive music accompanies both the demo screen and the demise of your spacecraft. The graphics are a delight – all spacecraft are represented by huge colourful sprites with the action occurring against a twinkling starscape.

Control of your ship is via keyboard or joystick. Movement is possible horizontally, vertically and diagonally, though you are restricted to the bottom quarter of the screen. In practice only left, right and fire are necessary.

The game is divided into 48 separate zones, each consisting of six waves of aliens.

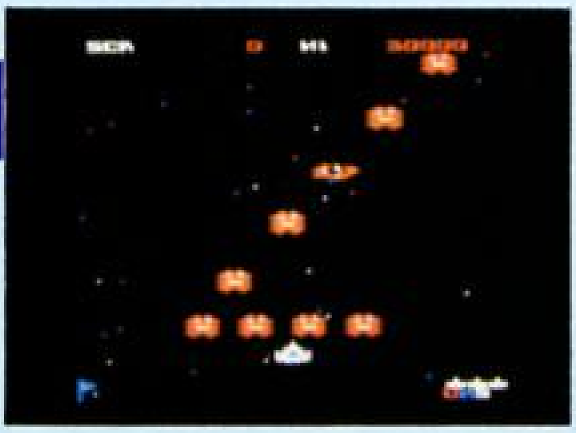
Zone 1 serves to break you in gently – the aliens tend to give in without a fight. The end of zone 2 sees the arrival of the motherships.

Close examination of the swarm of attacking aliens reveals that several of the little devils are releasing more fighters into the upper atmosphere! The destruction of these motherships must therefore be your main priority.

Zone 4 brings on the heavy brigade. Taking on a traditional space invaders formation a heavily armed bomber attacks you from behind a moving shield of other ships.

Each of the defending ships must be hit 5 times before it is destroyed and the bomber must be struck 10 times!

This seemingly impossible screen can be mastered with more than a little perseverance. You are then given time to recover as the next few screens are similar to those already encountered.



When being sent on such missions I like to know that my ship is capable of tackling anything the enemy can throw at me. The Galaforce spacecraft certainly lack nothing in the fire power department. Just hold down the fire button and admire the volley of electric death which soars skywards!

Galaforce is a game to get the adrenalin flowing, the kind of game you continue playing when you close your eyes in bed at night – it should carry a government health warning!

Jon Revis

Sound	*8*
Graphics	*9*
Playability	*10*
Value for money	*9*
Overall	*9*

Poker comes up trumps

Program: Poker
Price: £5.95
Supplier: Duckworth, The Old Piano Factory, 43 Gloucester Crescent, London NW1 7DY Tel: 01-485 3484

THE smoke hangs heavy in the still air of the Wild West saloon. With an evil glint in his eye Black Jake raises the stakes once more.

Is he bluffing? Can you afford to find out? Just two of the nail biting questions you will ask yourself as you play Poker from Duckworth.

Here is an opportunity to pit your skills against six of the meanest players in a game of five card draw poker.

Instructions on how to play the game are provided within the program, so even if you have never played poker before you will be able to hold your own with the best of them within 10 minutes of loading the game.

Play is simplicity itself. Whenever you are due to make a move a menu of the available choices is displayed. The micro even sorts your cards into the right order.

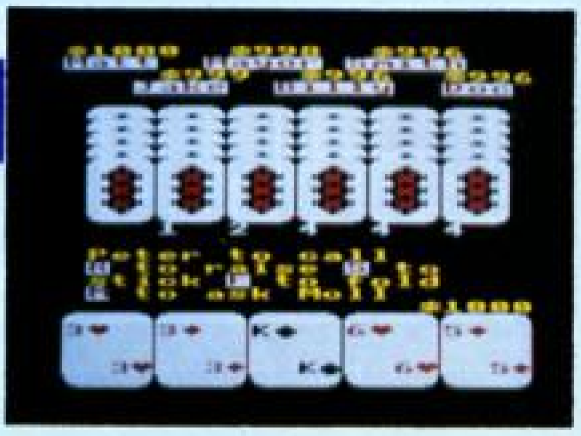
The dealer deals six hands face down and one for you face up, this being followed by the first round of betting. Stakes are raised in multiples of eight dollars, with no upper limit.

You begin the game with 1,000 dollars. You can stick, throw in your hand or discard up to three cards. Any new cards are dealt and the second round begins.

Betting continues until all remaining players have agreed to see each other's hands. At this point the computer announces each hand in turn and pays out the winner.

If you are new to the game you may be unsure of the best move to make, so you can have a quiet word with Moll the barmaid who will make suitable suggestions.

On occasions it can be quite rewarding to bluff your way through a hand. Your opponents are all experienced players and will often do the same thing. There is nothing worse than chickening out only to find that Billy the Kid only had a pair of twos!



I found Poker to be totally absorbing. Even though the money wasn't real I still got a thrill from collecting a big win.

Steve Brook

Sound	*5*
Graphics	*7*
Playability	*9*
Value for money	*9*
Overall	*8*

BACK TO BASICS

Third part of TREVOR ROBERTS' down-to-earth series

Different values

IF you think back, so far our solitary variable, a, hasn't varied at all. It's just stood for one value, in this case 5. Whenever we use five, we could have used a, and vice versa.

In fact, the variable a is rather more than just a label or a name that can be used in place of a number, as you'll see if you now enter:

```
LET a=6
```

and then:

```
PRINT a
```

The second LET has given a the value 6. The micro, fickle beast, forgets all about any previous value a may have had, and from now on when it comes to an a it substitutes the value 6. And if it comes across another LET such as:

```
LET a=123
```

the faithless brute now takes a to mean the value 123.

It doesn't always have to be a single number on the right of the equals sign, it can be an expression (or sum) as:

```
LET a=3+3
PRINT a
```

shows. You can even use another variable in the expression, as you'll see from the lines:

```
LET b=4
LET a=b+7
PRINT a
```

Here b, which is 4, is added to 7 and the result, 11, is stored under the label a.

You can even use the same variable name on both sides of the statement. Try:

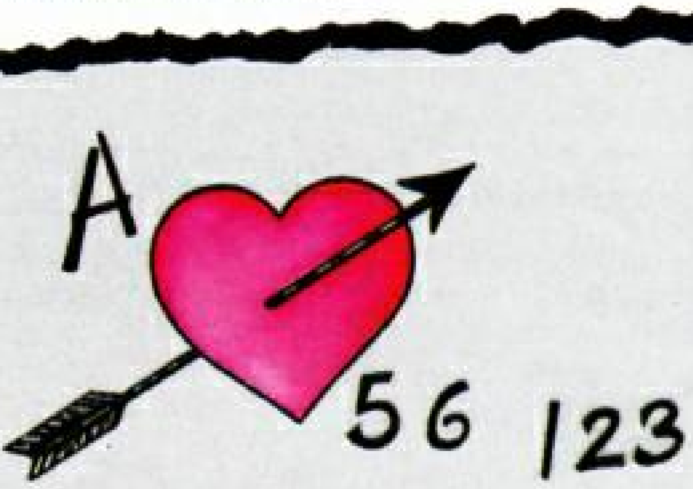
```
LET b=3
LET b=b+5
PRINT b
```

to see what happens. In this case b is originally given the value 3. The second LET tells the micro to take the value of b, add 5 to it and call the new value b. The old value of b is overwritten. This use of the same variable name may look a trifle silly (after all, why not:

```
LET c=b+3
```

which leaves b intact?) but the technique is used a lot when updating the values of variables.

AREA
LENGTH
WIDTH



LETting on about assignments

IF you want to be technical – and who doesn't in moments of self-delusion – then the line:

```
LET c=7
```

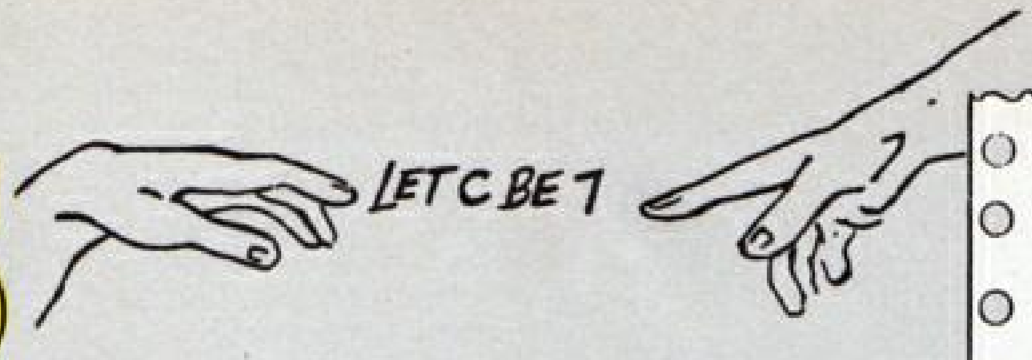
is known as an assignment statement. It assigns the value 7 to the numeric variable c. And it should properly be read as "c becomes 7" and not "c equals 7", which is what you and me and probably everyone else does.

This annoying trivial piece of Sunday Basic comes about because it's possible to have a line such as:

```
c=c+1
```

If we used the word equal then we'd have the line saying "c is equal to itself plus 1" which is silly. It's better read as "the new value of c becomes the old value of c plus 1".

I give you that bit of pendantry because someone somewhere is going to irritate you by picking you up on it. More pleasingly, you can irritate someone by picking them up on it! Who said programming wasn't fun?



Variables vary

As you LET the micro have different values for a variable, so the value of the variable varies, and as it can only do one thing at a time, it only holds the last number it was given. Any previous value is ignored or "overwritten" – lost for good. Hence the term variable. It's a name or label that stands for a number, but which particular number depends on the last assignment statement. The value of the variable varies.

This idea of a variable taking different values is fundamental to programming. And if it seems a little strange, it shouldn't be as we use it all the time. You probably know that the area of a rectangle is its length times its width. If the length of one side is 3 metres and the width 2, the area is 3 times 2 square metres. If the length is 10 and the width 5, the area is 50.

To get the area of a particular rectangle you just substitute the actual values for the terms length and width in the formula. And length and width are variables, names that stand for values. The actual values used vary from case to case.

A TESTING TIME

To test your knowledge of variables, try to spot the difference between:

```
LET number=4
PRINT number+3
```

and:

```
LET number=4
LET number=number+3
PRINT number
```

Both display the number 7 but they do it in different ways. Can you see how?

Answer: In the first case the value of number is still 4. It's been used in a sum with 3 to give 7, but has not changed in value. It remains obstinately 4 as you'll see if you:

```
PRINT number
```

afterwards.

In the second case, number is changed to 7 before being PRINTed. This may seem a technical point but in the long complicated programs you'll be writing before long, you'll soon see how annoying it is to have variables change value on you unexpectedly.

A simple program

Now for something completely different. Try typing in:

```
10 PRINT "Anystring"
```

and see what happens. The answer is nothing. The line just sits there even though you've pressed Return. This is rather different from:

```
PRINT "Anystring"
```

which has:

```
Anystring
```

appearing on screen immediately.

The difference lies in the 10 that starts the line. Until now, nearly everything that we've typed into the micro such as:

```
PRINT "This starts with a keyword"
```

or:

```
CLS
```

has started with a keyword and been obeyed at once. This is using the Electron in command mode. However, if the line begins with a number things are different. Now the micro waits until you tell it you want it to process or obey that line. There's a gap between typing in the line and performing it. The operating system, the brains of the micro, stores it away in its memory until it's needed. So:

```
10 PRINT "Anystring"
```

is tucked away in the micro's memory, biding its time.

Prove this to yourself by clearing the screen with CLS and then enter:

```
LIST
```

when:

```
10 PRINT "Anystring"
```

will appear again. As you'll have guessed, LIST is a keyword that forces the micro to divulge all the numbered lines it has tucked away in its memory. These numbered lines make up a program, of which a lot more will be said.

Now let's get the micro to process the line numbered 10 (the only one it has so far) with:

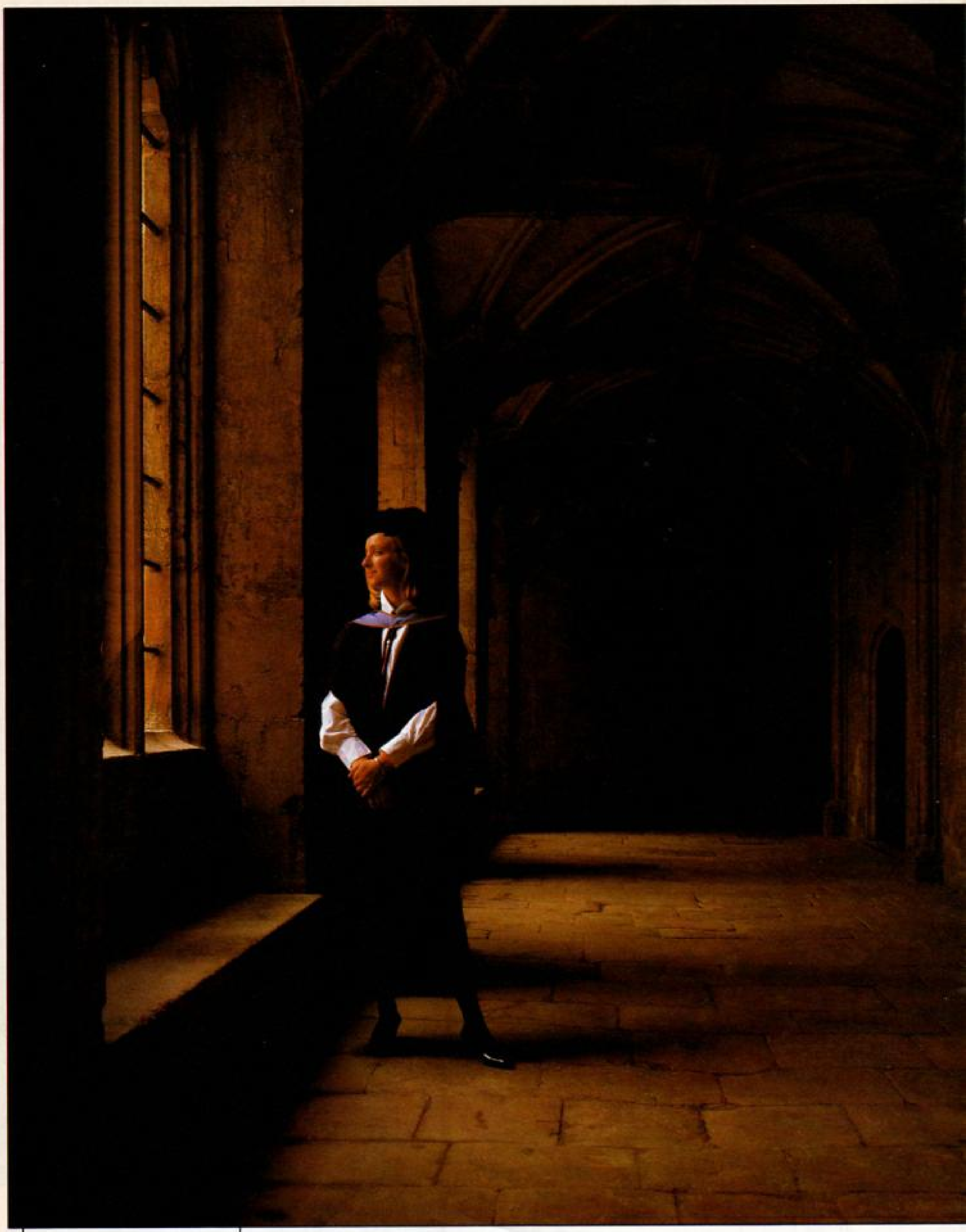
```
RUN
```

which results in:

```
Anystring
```

appearing on the screen.

Congratulations! You've just run your second program. Can you remember the first? At least you understand what's happening now. Lots more next month.



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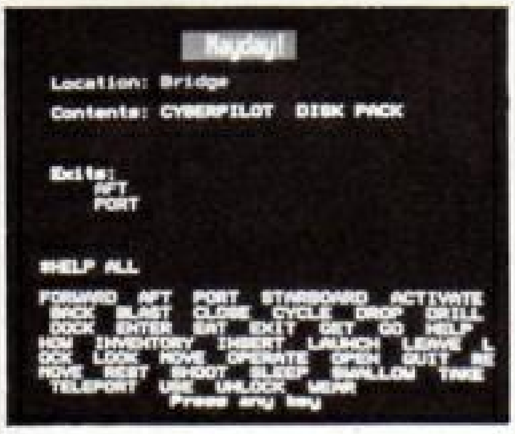

```
                 Mayday!
  Location: Bridge
  Contents: CYBERPILOT  DISK PACK

  Exits:
      AFT
      PORT

 #HELP ALL

 FORWARD  AFT  PORT  STARBOARD  ACTIVATE
  BACK  BLAST  CLOSE  CYCLE  DROP  DRILL
  DOCK  ENTER  EAT  EXIT  GET  GO  HELP
 HOW  INVENTORY  INSERT  LAUNCH  LEAVE  L
 OCK  LOOK  MOVE  OPERATE  OPEN  QUIT  RE
 MOVE  REST  SHOOT  SLEEP  SWALLOW  TAKE
  TELEPORT  USE  UNLOCK  WEAR
            Press any key
```

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TO ORDER TURN TO THE FORM ON PAGE 53

Friendly – and foolproof

DAVID RICHARDS looks at Slogger's Starstore II

Product: Startore II
Price: £29.95
Supplier: Slogger, 107 Richmond Road, Gillingham, Kent. Tel: 0624 52303.

IN the September 1986 issue of *Electron User* I reviewed Slogger's Starstore, a powerful rom based database. Now an alternative version is available, Starstore II.

Essentially they are the same except in one important aspect, Starstore I is ram based and can be used with both disc and tape systems whereas Starstore II is disc based and will only work if you have a disc system.

To see just what Starstore is capable of take a look at the Starstore I review. Here I'm just going to cover the main differences between the two.

The space available for data storage with a ram based database is limited by the amount of free ram, around 18k on the Electron. In this type of database all the records are present in the memory at the same time.

With a disc based database you are only limited by the amount of free space on the disc, which can be as much as 320k with a Plus 3.

The records are stored on disc and the database will read and write records from and to the disc rather than store them in the memory.

The advantage of Starstore II over Starstore I is the vast amount of data it can handle.

Unfortunately discs are relatively slow to access when compared with ram, and Starstore II can be painfully slow at times. I must add that it's not a fault of the program – it is limited by the speed of your disc system.

Slogger has totally rewritten the menu structure of the database to bring it up to date and make it as user-friendly as possible.

Much care and attention to detail has gone into the layout and appearance and it now features pop up menus, cursor selection and helpful prompts whenever possible.

It is a joy to use and so simple that even children can get the hang of it without difficulty.

On power up or after Control+Break you are straight into Starstore II's main menu and the options are the same as before.

The package can handle 9999 records with a maximum of 90 fields which can be 255 characters in length. Provided of course that you have enough storage space on your disc.

You can browse through the records using the cursor keys and examine, alter and update any of the fields. Data is pulled off the disc as and when needed.

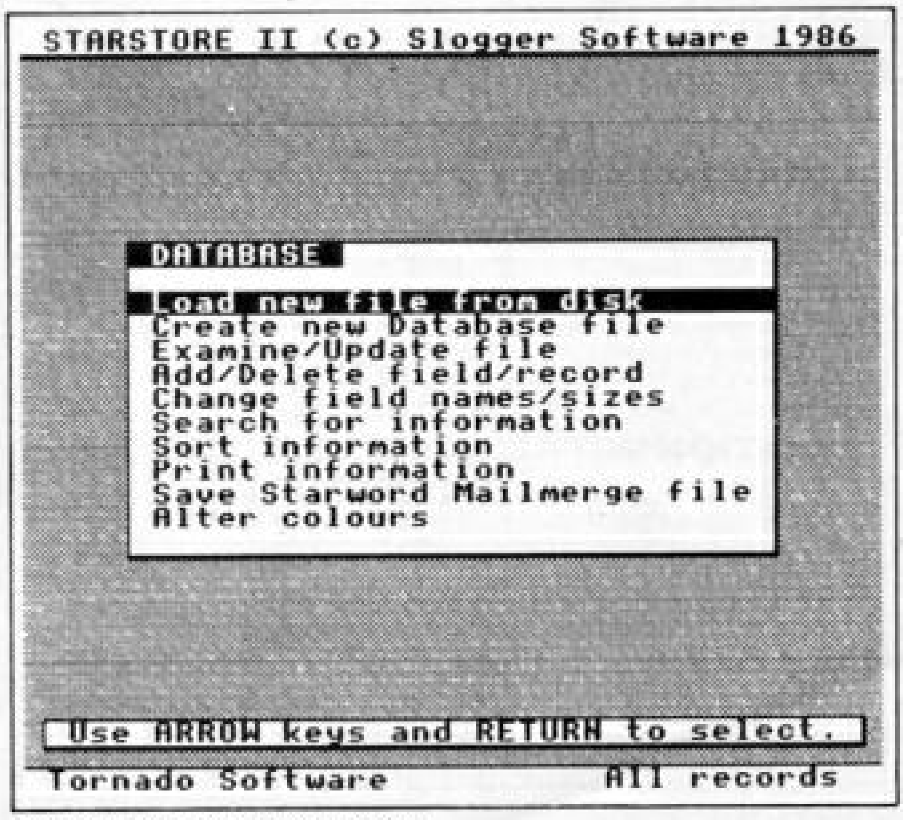
Sorting records can be quite a time-consuming process and is measured in minutes rather than seconds. It is a chore that would be better left until you have plenty of time to spare.

An extra print option has been included which allows you to format the output. Record fields can be printed in any order and printed at a set tab position across the page.

Like Starstore I, it is possible to generate Starword mail merge files. Starword can take a file of names and addresses created from a Starstore database and include them in a standard letter.

The manual is comprehensive, well written and easy to understand, giving some useful examples on how to set up a database.

The whole package is foolproof and well presented. Starstore II is a superb database for the Electron user who uses discs and it adds another dimension to those using Starword. ■

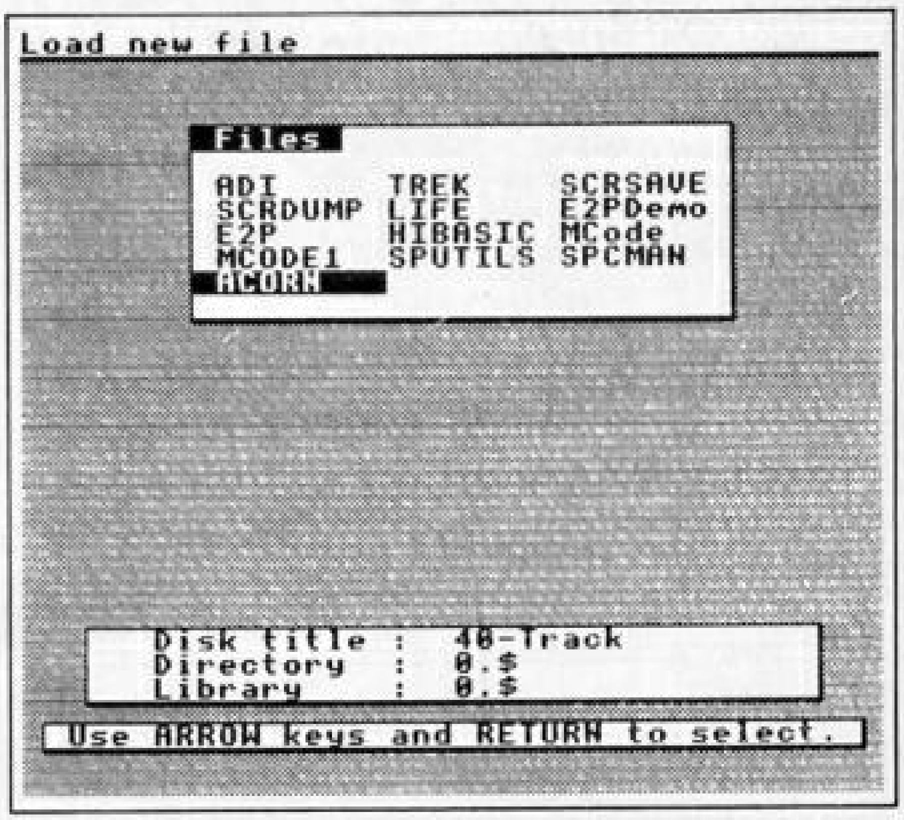


```
STARSTORE II (c) Slogger Software 1986

DATABASE
Load new file from disk
Create new Database file
Examine/Update file
Add/Delete field/record
Change field names/sizes
Search for information
Sort information
Print information
Save Starword Mailmerge file
Alter colours

Use ARROW keys and RETURN to select.
Tornado Software            All records
```

Figure I: Starstore II main menu



```
Load new file

Files
ADI      TREK     SCRSAVE
SCRDUMP  LIFE     E2PDemo
E2P      HIBASIC  MCode
MCODE1   SPUTILS  SPCMAN
ACORN

Disk title  :  40-Track
Directory   :  0.$
Library     :  0.$
Use ARROW keys and RETURN to select.
```

Figure II: The file loading menu

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READ the instructions carefully

ALAN McLACHLAN ends his series on finding mistakes that produce those dreaded error messages

MY hints and tips seem to be working because the number of your letters about listing problems has dwindled quite dramatically. Either that or the postman's dumping them in the river.

Anyway, let's get straight into some useful advice to get those programs running.

I suspect the type of program most feared by beginners is one that consists of lines and lines of data statements waiting to be accessed by your Electron's READ command.

I must admit that many of my first programs would have been greatly improved with the use of this command, but I never really took the trouble to get the hang of it.

Although READ and DATA are great for reducing the amount of typing that faces a programmer they can cause havoc to the poor chap trying to fathom out what's going on.

Let's demonstrate this with a simple program. Type in Program I and run it.

```
10 REM PROGRAM I
20 CLS
30 FOR X= 1 TO 5
40 READ A,B
50 PRINT TAB(A,B) "*"
60 NEXT
70 DATA 10,6,2,20,5,15,1,23
,36,8
80 GOTO 80
```

Program I

Lines 30 to 60 create a loop which is executed five times. Within this loop DATA in line 70 is READ in, in pairs, allocated to the variables *A* and *B* and used to print a series of asterisks on the screen.

Line 80 is just a dummy line to suppress the > prompt. I agree it isn't exactly the most spectacular piece of programming you are likely to come across, but it is only meant to be a simple demonstration. Program II, which involves more typing, produces identical results. For the purpose of this article though, the programs' actual effects matter less than the error messages produced by our first version should anything go wrong with it.

```
10 REM PROGRAM II
20 CLS
30 PRINT TAB(10,6)"*"
40 PRINT TAB(2,20)"*"
50 PRINT TAB(5,15)"*"
60 PRINT TAB(1,23)"*"
70 PRINT TAB(36,8)"*"
80 GOTO 80
```

Program II

Let's assume you've accidentally mistyped a full stop for a comma in the list of data in line 70 of Program I.

That is:

```
70 DATA 10,6,2,20,5,15.1,23
,36,8
```

It is easily done, particularly if you have already typed in more than 100 lines of data. And it's even more likely when you know you have another 100 to come.

Line 40 is attempting to read five pairs of numbers – 10 in all – but it is only encountering four and a half pairs, nine numbers.

What should have been a "read" of number 15 followed by a "read" of number 1 (two numbers) is now being read as 15.1, one number with a decimal point. Consequently your Electron reports 'Out of DATA at line 40'.('Out of IDEAS at midnight' might be more appropriate).

Anyway, that message means that line 40 has run out of DATA to READ. But if you list line 40 you will find it apparently in order – and so it is.

A lot of your letters on this subject complain that you have checked the error line and it is exactly the same as the one in the magazine. In fact this message is not as helpful as it first appears.The real error lies in the DATA line some distance away although it is reported as being in the READ line.

Right, so we now know where the error is, therefore problem solved. But here we have only one line of DATA. What if you had in fact a whole slew of DATA lines, say 100?

Let's face it, the error would be very difficult to find, and you would need eyes like a hawk to spot that full stop.

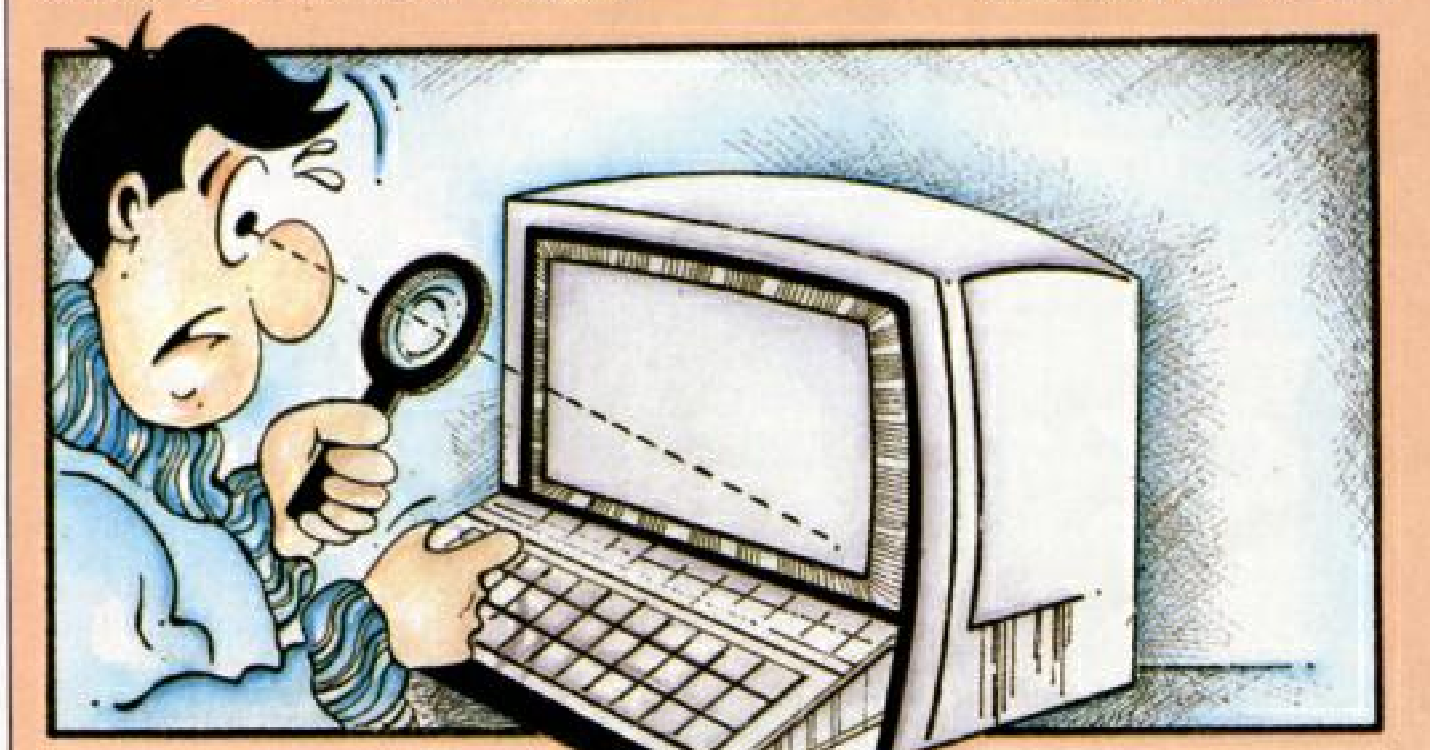
A useful method of finding an error in lists of data is to PRINT the data immediately after it has been READ, but before the program has had a chance to do anything with it.

Alter Program I so that it contains the data error in line 70,and REM line 50 to preserve it from harm while we're debugging (last month's tip). Next insert lines 45 and 46:

```
45 PRINT A,B
46 Z=GET
```

Your modified Program I

→



'Let's face it, the error would be very difficult to find, and you would need eyes like a hawk to spot that full stop'

From Page 23

should now be identical to Program III.

```
10 REM PROGRAM III
20 CLS
30 FOR X= 1 TO 5
40 READ A,B
45 PRINT A,B
46 Z=GET
50 REM PRINT TAB(A,B)"*"
60 NEXT
70 DATA 10,6,2,20,5,15.1,2
3,36,8
80 GOTO 80
```

Program III

Run it. Your DATA should appear as pairs of numbers needing a key press to display each successive pair. The numbers will appear on screen as in Figure I.

```
         10         6
          2        20
          5      15.1
         23        36
   Out of DATA at line 40
```

Figure I: The screen output

The black sheep stands out like a sore thumb. This tip is invaluable when there is a large amount of data to check.

You'll also have problems if you accidentally omit a data item and leave the comma in the right place. Change line 70 of Program III to:

```
70 DATA 10,6,2,20,5,15,,2
3,36,8
```

Notice the difference as your micro now responds with a 'No such variable at line 40'? It is looking for an integer to assign to the variable *A* but finds nothing there.

The error message appears before all the data has been printed out, so this should tell you that your error is the next item trying to be READ. Look through the data statements for the last item printed, the 15, and sure enough immediately after it appears the typing error.

Another kind of typing mistake can also cause irritation, particularly when using the DATA command. Try altering line 70 to read:

```
70 DATA 10,6,2,2O,5,15,1,
23,36,8
```

making sure that you type a capital O in the fourth item (20) instead of the correct zero.

Here we know we know we have made a mistake but unfortunately the Electron doesn't, so naturally does not provide an error message. You see, it reads the fourth data item and sees it as just the number 2, then carries on to READ the next item.

The result of the error will only become apparent when you see the screen display and wonder why one of the asterisks is not in the right place.

Imagine if it had been a complicated graphics screen full of colourful levels and ladders which your little man wouldn't climb up.

You would probably be convinced that the program was wrong and not your typing, for if you had made a mistake likely as not one of the ladders would have been printed in the wrong place.

Now try this one:

```
70 DATA 10,6,2,20,5,15,1,
23,36,8
```

making sure you use a lower case L where the 1 should be – the seventh item. This a similar mistake to the last one, but look at the difference in its result.

Your Electron has come across something it can't READ into the numeric variable, and accordingly provides the same error message as before: 'No such variable at line 40'.

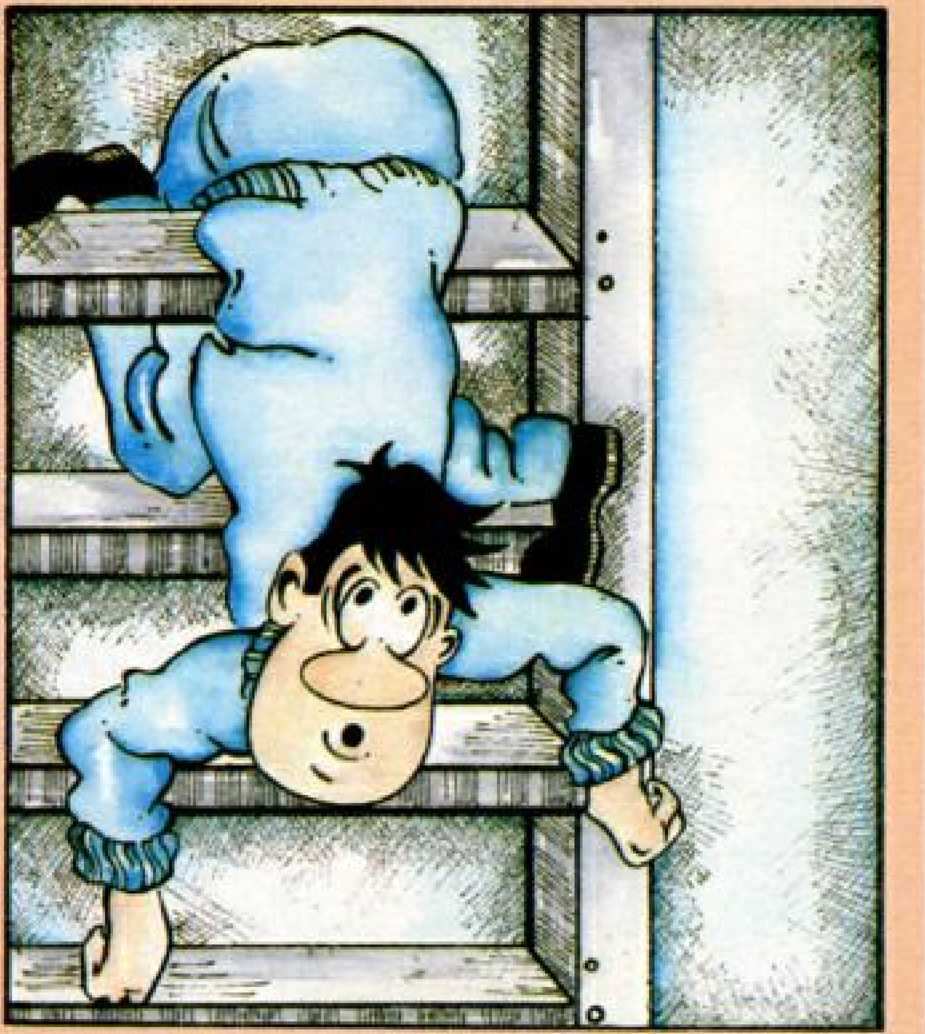
Once again the error is in line 70 data. The Electron may have done the dirty on you in reporting the error, but the mistake is definitely yours.

These examples demonstrate that there are lots of error messages that specify a correctly entered line, when in fact if you follow your programming logic that line will point to another which is in error.

When your Electron encounters an error it automatically puts a message on screen indicating the type of error and the line it was processing when it first encountered it.

While this is very useful it can cause problems occasionally when the programmer has been playing around with the colours.

For example, at the moment the error was encountered your machine could have been drawing on the background in the background colour.



'Imagine if it had been a complicated graphics screen full of colourful levels and ladders which your little man wouldn't climb up'

In these circumstances you wouldn't have been able to see the resultant message.

Your Electron provides you with facilities to create your own error report – the ON ERROR and REPORT commands, and the system variable ERL (the error line).

If you type in Program IV – there's a deliberate error in it – you will see the sort of thing I mean:

```
10 REM PROGRAM IV
20 ON ERROR MODE 6:REPORT
PRINT " at line ";ERL:END
30 MODE 5:COLOUR 1:COLOUR
129:CLS
40 FOR X = 1 TO 4
50 READ A
60 NEXT
70 DATA 1,2,3
```

Program IV

This is how it works. Line 20 suppresses the normal error reporting routine and creates our own. Then lines 30-70 generate the same error as the one we've looked at already in Program I – 'Out of DATA'.

In line 30 I have deliberately set the foreground and background to the same colour red.

Run the program and you'll see that although it is written in Mode 5 the error is reported clearly in black and white in Mode 6.

If you REM line 20 you will see that although the error is still there you cannot see the message. Try altering line 30 so that the foreground colour is COLOUR 2, yellow, and see the difference.

You can add line 20 to the beginning of any program, but be wary of the possibility that the writer could have already incorporated a different error handling routine of his own later in the program.

I mentioned this in my first article in the September issue of *Electron User* and its importance cannot be overstressed.

Don't be frightened of REMing out the original routine so that your own can take effect.

Well I think you have enough there to be going on with. If the number of programming queries keep dropping at its present rate I might even be out of a job.

Still that would mean an end to being up all night sorting out everyone's problems. Now I'll be up all night sorting out my own. ■

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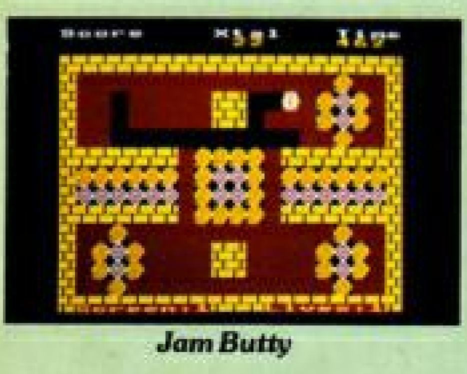

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Jam Butty: *Machine code simulation of high drama on a building site.*
Golf: *Play a round by yourself, or play against your pals.*
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Parky's Peril: *Help Parky through an invisible maze, racing against time.*
Rally Driver: *All the thrills of high-speed driving, with none of the risks.*
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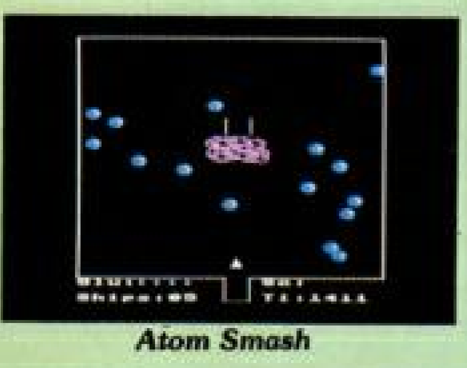

Atom Smash

Volume 2

Atom Smash: *Machine code thrills as you help to save the world from destruction.*
Bunny Blitz: *Go egg collecting, but keep away from the proliferating rabbits.*
Castles of Sand: *Build castles – but beware the rising tide and hungry sandworms.*
Reaction Timer: *Test your reactions with this traffic lights simulation.*
Solitaire: *The Electron version of the age-old game of logic and patience.*
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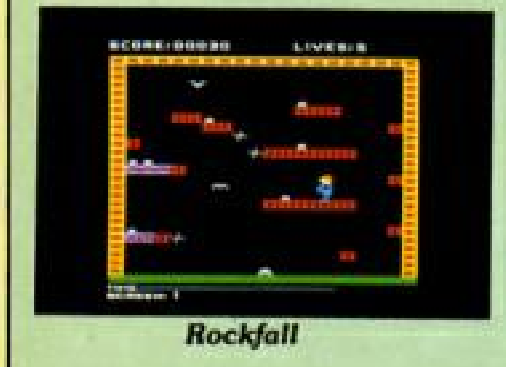
NEW!



Rockfall

Volume 3

Rockfall: *Come diamond mining in this fun packed game with its own screen designer.*
Karate Warrior: *Win your black belt in this gruelling test of karate skill.*
Grand Prix: *Battle your way into the lead in this tricky racing simulation.*
Invasion Force: *Can you survive wave after wave of relentlessly advancing aliens?*
Grebit: *Guide the frog across the busy road then across the fast-flowing river!*
Fruit Worm: *Steer the worm towards the fruit while avoiding rocks and its ever-growing tail.*
Manic Mole: *Watch out for melting platforms and conveyor belts in your quest for jewels.*
Skramble: *Fly your fighter fast and low over the landscape to penetrate enemy territory.*
Mr Freeze: *You'll need speed and strategy to reach the ice blocks before they melt away.*
Paint Roller: *Steer a speeding roller, run over paint pots but keep clear of the rocks.*

TO ORDER PLEASE USE THE FORM ON PAGE 53

By SIMON BRATT

A DAY AT THE RACES

IT'S your birthday and you've just been given £150 from friends and relatives.

Being a bit of a gambler you decide to dash off to the nearest race track and make your fortune on the horses. Will you succeed or return home penniless?

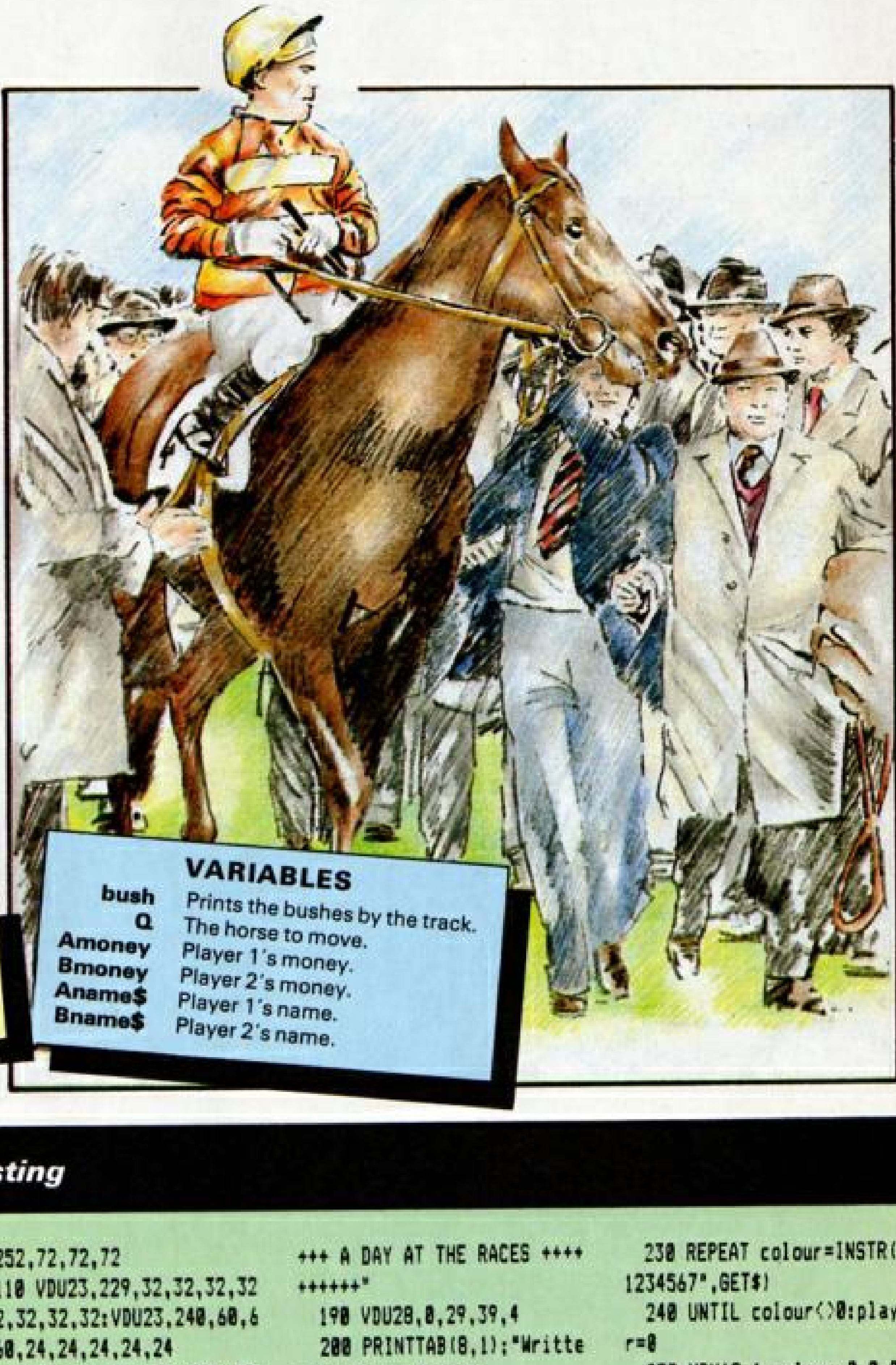
You can go by yourself or take a friend by choosing a one or two player game from the opening menu. There are also options to change the colours and read the instructions.

Just before each race the horses, jockeys and starting prices are displayed. Choose your horse, then enter the amount you wish to bet.

The five furlong race starts shortly after, with the horses furiously dashing across the screen.

The winner will be announced and if you bet lucky you'll receive your winnings. If you lose all your birthday money the game ends.

Have fun and mind you don't lose your shirt!



PROCEDURES

start	Starts the game.
instruct	Prints the instructions.
screen2	Runs the main game.

VARIABLES

bush	Prints the bushes by the track.
Q	The horse to move.
Amoney	Player 1's money.
Bmoney	Player 2's money.
Aname$	Player 1's name.
Bname$	Player 2's name.

A Day at the Races listing

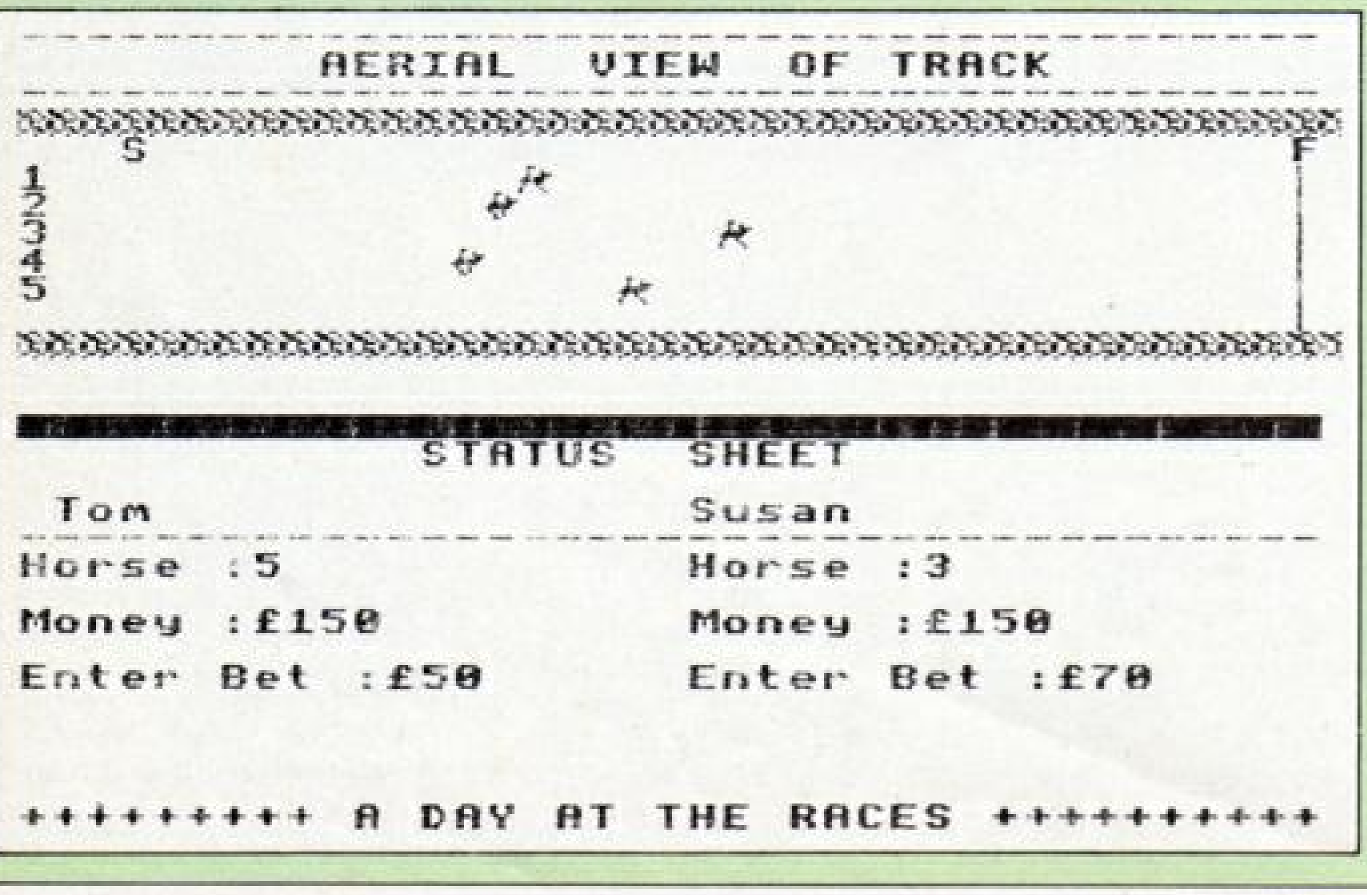
```
   10 REM Day at the races
   20 REM By Simon Bratt
   30 REM (c) Electron User
   40 player=0:MODE4:*FX16
   50 ONERRORCOLOUR128:COLO
UR1:GOTO1990
   60 VDU26:VDU23,225,153,2
28,114,157,145,157,102,136:
Bbet=0:Bhorse=0
   70 VDU23,226,48,36,39,12
6,252,72,40,48
   80 cc=1
   90 VDU23,227,48,36,39,12
6,252,72,132,130
  100 VDU23,235,48,36,39,12
6,252,72,72,72
  110 VDU23,229,32,32,32,32
,32,32,32,32:VDU23,240,60,6
0,60,24,24,24,24,24
  120 VDU23,228,255,255,255
,255,255,255,255,0
  130 *KEY 10 O.!MCLS!ML.!M
  140 CLS:VDU23,1;0;0;0;0;
  150 DEFPROCstart
  160 Amoney=150:Bmoney=150
:Bname$=" ":Bbet=0
  170 PRINTTAB(0,30);"+++++
++++ A DAY AT THE RACES +++
++++++++"
  180 PRINTTAB(0,3);"++++++
+++ A DAY AT THE RACES ++++
++++++"
  190 VDU28,0,29,39,4
  200 PRINTTAB(8,1);"Writte
n by Simon Bratt"
  210 IF player=4 THENPRINT
TAB(12,5)"1......RED";TAB(1
2,7)"2.......GREEN";TAB(12,9
)"3.......YELLOW";TAB(12,11)
"4......BLUE";TAB(12,13)"5.
.....MAGENTA";TAB(12,15)"6.
.....CYAN";TAB(12,17)"7....
..WHITE" ELSE 260
  220 PRINT''" Option (1-7)
 :"
  230 REPEAT colour=INSTR("
1234567",GET$)
  240 UNTIL colour<>0:playe
r=0
  250 VDU19,1,colour,0,0,0:
CLS:GOTO 50
  260 PRINTTAB(5,5)"1......
.....1 Player..";TAB(5,7)"2
...........2 Player..";TAB(
5,9)"3...........Instructio
ns..";TAB(5,11)"4..........
.Change Colour.."
  270 PRINT''"Option (1-2-3-
4) :":SOUND1,-15,32,1
```

→

A Day at the Races listing

From Page 29

```
280 REPEAT player=INSTR("1234",GET$)
290 UNTILplayer<>0:PRINTTAB(18,13);player
300 IF player=3 THENPROCinstruct
310 IF player=4 THENCLS:GOTO 50
320 SOUND1,-15,54,1
330 INPUT'"Enter player 1's name :"Aname$:Aname$=LEFT$(Aname$,10)
340 SOUND1,-15,80,1
350 IF player=2 THENINPUT'"Enter player 2's name :"Bname$:Bname$=LEFT$(Bname$,10):SOUND1,-15,89,1:PROCscreen2 ELSE PROCscreen2
360 DEFPROCinstruct
370 CLS:PRINT''"          I N S T R U C T I O N S"
380 PRINT''"You are given `150 for your birthday and"''"decide to spend a day at the races."
390 PRINT''"Each of the races has five horses in."''"You are given the name of the horses and"''"their jockeys."
400 PRINT''"On the far right are the prices like 4/1"''"or 9/1. When you pick your horse take"''"this into consideration."
410 PRINT'"            Press <SPACE>":REPEATUNTILGET=32:SOUND1,-15,196,1:CLS
420 PRINT''''"Choose your horse then the amount you"''"wish to invest."
430 PRINT''"You can't bet more than you have!"
440 PRINT''''"          Press <SPACE>":REPEATUNTILGET=32:GOTO 50
450 DEFPROCscreen2
460 RESTORE
470 CLS:border=0
480 PRINTTAB(border,12);CHR$228;:border=border+1
490 IF border=39 THENGOTO 500 ELSE 480
500 VDU28,0,14,38,3
510 COLOUR129:COLOUR0:CLS
520 PRINTTAB(2,1);"HORSE";TAB(17,1);"JOCKEY";TAB(31,1);"PRICE"
530 READA$,B$,C$,D$,E$,G$,H$,I$,J$,K$
540 PRINTTAB(0,3);"1) ";A$;"   ";G$:price1=RND(10):PRINTTAB(31,3);price1;"/1"
550 PRINT"2) ";B$;"   ";H$:price2=RND(10):PRINTTAB(31,4);price2;"/1"
560 PRINT"3) ";C$;"   ";I$:price3=RND(10):PRINTTAB(31,5);price3;"/1"
570 PRINT"4) ";D$;"   ";J$:price4=RND(10):PRINTTAB(31,6);price4;"/1"
580 PRINT"5) ";E$;"   ";K$:price5=RND(10):PRINTTAB(31,7);price5;"/1"
590 PRINT';Aname$;" choose a horse (1-5) :    "
600 REPEAT Ahorse=INSTR("12345",GET$)
610 UNTIL Ahorse<>0:SOUND1,-15,32,1
620 IFplayer=2 THENPRINTTAB(0,9);Bname$;" choose a horse (1-5) :    ":REPEAT Bhorse=INSTR("12345",GET$):UNTIL Bhorse<>0:SOUND1,-15,54,1
630 COLOUR128:COLOUR1
640 CLS
650 VDU26
660 PRINTTAB(0,2);"----------------------------------------"
670 PRINTTAB(8,3);" AERIAL  VIEW  OF TRACK "
680 PRINTTAB(0,4);"----------------------------------------"
690 bush=0
700 PRINTCHR$225;
710 bush=bush+1
720 IF bush=40 THEN740
730 GOTO 700
740 sl=7:fl=7
750 PRINT'"1 ";CHR$235:PRINT"2 ";CHR$235:PRINT"3 ";CHR$235:PRINT"4 ";CHR$235:PRINT"5 "CHR$235
760 PRINTTAB(3,sl);CHR$229:sl=sl+1
770 IF sl=13 THEN780 ELSE GOTO 760
780 bush=0
790 PRINTCHR$225;
800 bush=bush+1
810 IF bush=40 THEN 830
820 GOTO 790
830 PRINTTAB(38,fl);CHR$229:fl=fl+1
840 IF fl=13 THEN850 ELSE 830
850 PRINTTAB(3,6)"S"
860 PRINTTAB(38,6)"F"
870 VDU28,0,29,39,17
880 PRINTTAB(12,0);"STATUS  SHEET"
890 PRINTTAB(1,2);Aname$
900 PRINTTAB(20,2);Bname$
910 PRINT"---------------------------------------"
920 PRINT"Horse :";Ahorse
930 IF player=2THENPRINTTAB(20,4)"Horse :";Bhorse:PRINTTAB(20,6);"Money :`";Bmoney
940 VDU23,1,1;0;0;0;0;
950 PRINTTAB(0,6)"Money :`";Amoney
960 COLOUR1:INPUTTAB(0,8)"Enter Bet :`"Abet:Abet=ABS(Abet)
970 IF Abet>Amoney THEN PRINTTAB(12,8);"          ":GOTO 960
980 IF player=2 THENINPUTTAB(20,8)"Enter Bet :`"Bbet:Bbet=ABS(Bbet):IFBbet>Bmoney THENPRINTTAB(32,8)"      ":GOTO 980
990 VDU23,1;0;0;0;0;
1000 PRINTTAB(7,10)"Press <SPACE> for the race":REPEATUNTILGET=32
1010 PRINTTAB(7,10);SPC(27)
1020 VDU26
1030 PRINTTAB(15,9)"READY  ":A=INKEY100
1040 PRINTTAB(15,9)"STEADY ":A=INKEY100
1050 PRINTTAB(15,9)"  GO   ":slu=7
1060 PRINTTAB(3,slu)" ":slu=slu+1
1070 IF slu=13 THEN 1080 ELSE 1060
1080 SOUND1,-15,32,2:PRINTTAB(17,9);"  "
```

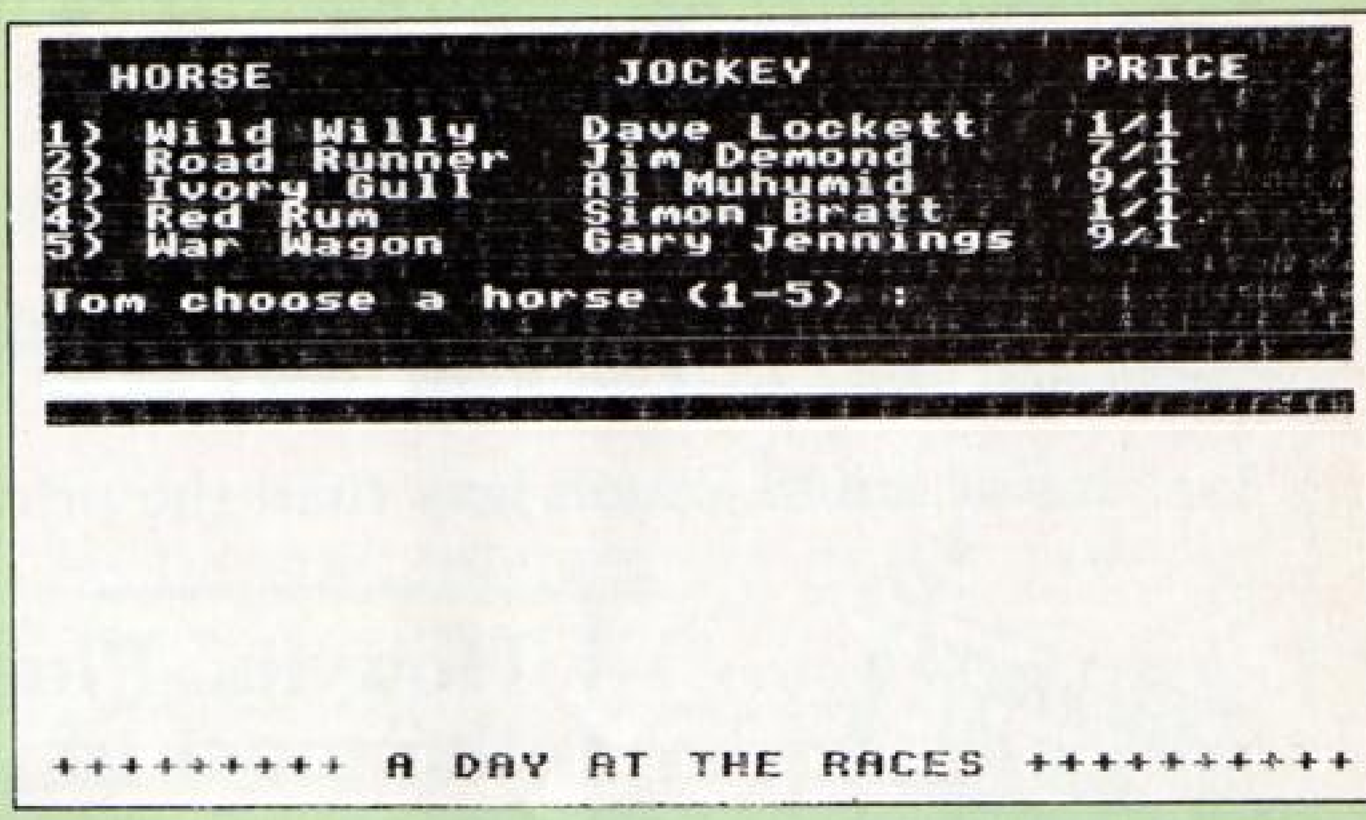


```
AERIAL  VIEW  OF TRACK

   S                                  F
1
2
3
4
5

          STATUS  SHEET
 Tom                  Susan
---------------------------------------
Horse :5             Horse :3
Money :£150          Money :£150
Enter Bet :£50       Enter Bet :£70

+++++++++ A DAY AT THE RACES ++++++++++
```



```
   HORSE                    JOCKEY                 PRICE
1) Wild Willy           Dave Lockett            1/1
2) Road Runner          Jim Demond              7/1
3) Ivory Gull           Al Muhumid              9/1
4) Red Rum              Simon Bratt             1/1
5) War Wagon            Gary Jennings           9/1
Tom choose a horse (1-5) :

++++++++++  A DAY AT THE RACES  ++++++++++
```

```
 1090 DATA Wild Willy,Road
Runner,Ivory Gull,Red Rum,W
ar Wagon,Dave Lockett,Jim D
emond,Al Muhumid,Simon Brat
t,Gary Jennings
 1100 REM move horses
 1110 REM horse 1
 1120 A=3:B=3:qe=3:qw=3:tv=
3:vt=3:Y=3:U=3:I=3:O=3
 1130 PRINTTAB(qw-1,7)" "
 1140 IFcc=1 THENPRINTTAB(q
e,7);CHR$227
 1150 IFcc=2 THENPRINTTAB(q
e,7);CHR$226
 1160 PRINTTAB(qe,7)" "
 1170 IFcc=1 THENPRINTTAB(q
w,7);CHR$226
 1180 IFcc=2 THENPRINTTAB(q
w,7);CHR$227
 1190 qw=qw+1:qe=qe+1
 1200 GOTO 1570
 1210 REM horse2
 1220 PRINTTAB(A-1,8)" "
 1230 IFcc=1 THENPRINTTAB(B
,8);CHR$227
 1240 IFcc=2 THENPRINTTAB(B
,8);CHR$226
 1250 PRINTTAB(B,8)" "
 1260 IFcc=1 THENPRINTTAB(A
,8);CHR$226
 1270 IFcc=2 THENPRINTTAB(A
,8);CHR$227
 1280 A=A+1:B=B+1
 1290 GOTO 1570
 1300 REM horse3
 1310 PRINTTAB(tv-1,9)" "
 1320 IFcc=1 THENPRINTTAB(v
t,9);CHR$226
 1330 IFcc=2 THENPRINTTAB(v
t,9);CHR$227
 1340 PRINTTAB(vt,9)" "
 1350 IFcc=1 THENPRINTTAB(t
v,9);CHR$227
 1360 IFcc=2 THENPRINTTAB(t
v,9);CHR$226
 1370 tv=tv+1:vt=vt+1
 1380 GOTO 1570
 1390 REM horse4
 1400 PRINTTAB(Y-1,10)" "
 1410 IFcc=1 THENPRINTTAB(U
,10);CHR$227
 1420 IFcc=2 THENPRINTTAB(U
,10);CHR$226
 1430 PRINTTAB(U,10)" "
 1440 IFcc=1 THENPRINTTAB(Y
,10);CHR$226
 1450 IFcc=2 THENPRINTTAB(Y
,10);CHR$227
 1460 Y=Y+1:U=U+1
 1470 GOTO 1570
 1480 REM horse5
 1490 PRINTTAB(I-1,11)" "
 1500 IFcc=1 THENPRINTTAB(O
,11);CHR$226
 1510 IFcc=2 THENPRINTTAB(O
,11);CHR$227
 1520 PRINTTAB(O,11)" "
 1530 IFcc=1 THENPRINTTAB(I
,11);CHR$227
 1540 IFcc=2 THENPRINTTAB(I
,11);CHR$226
 1550 O=O+1:I=I+1
 1560 GOTO 1570
 1570 Q=RND(5):SOUND 0,-15,
4,1
 1580 IF cc=1 THEN cc=2:GOT
O 1600
 1590 IF cc=2 THEN cc=1
 1600 IF qe=39 THENPRINTTAB
(6,9)"Horse 1 has won!":P=p
rice1:GOTO1700
 1610 IF A=39 THENPRINTTAB(
6,9)"Horse 2 has won!":P=pr
ice2:GOTO 1700
 1620 IF tv=39 THENPRINTTAB
(6,9)"Horse 3 has won!":P=p
rice3:GOTO 1700
 1630 IF Y=39 THENPRINTTAB(
6,9)"Horse 4 has won!":P=pr
ice4:GOTO 1700
 1640 IF I=39 THENPRINTTAB(
6,9)"Horse 5 has won!":P=pr
ice5:GOTO 1700
 1650 IF Q=1 THEN 1130
 1660 IF Q=2 THEN 1220
 1670 IF Q=3 THEN 1310
 1680 IF Q=4 THEN 1390
 1690 IF Q=5 THEN 1480
 1700 PRINTTAB(6,11)"Press
<SPACE>":REPEATUNTILGET=32
 1710 PRINTTAB(6,11)"
       ":PRINTTAB(6.9)"
              "
 1720 VDU28,0,29,38,18
 1730 CLS
 1740 IF qe=39 AND Ahorse=1
 THEN1790
 1750 IF A=39 AND Ahorse=2
THEN1790
 1760 IF tv=39 AND Ahorse=3
 THEN1790
 1770 IF Y=39 AND Ahorse=4
THEN1790
 1780 IF I=39 AND Ahorse=5
THEN1790 ELSE 1840
 1790 PRINT''" ";Aname$;" w
on and gets '";Abet;" * ";P
;"='";Abet*P:SOUND1,-15,172
,10
 1800 IF Bhorse=Ahorse THEN
Amoney=Amoney+Abet*P:Bmoney
=Bmoney+Bbet*P
 1810IF Bhorse=Ahorse THENP
RINT'" ";Bname$;" won and g
ets '";Bbet;" * ";P;"='";Bb
et*P:SOUND1,-15,80,5:GOTO19
60
 1820 Amoney=Amoney+Abet*P
 1830 Bmoney=Bmoney-Bbet:GO
TO 1960
 1840 IF qe=39 AND Bhorse=1
 THEN1890
 1850 IF A=39 AND Bhorse=2
THEN1890
 1860 IF tv=39 AND Bhorse=3
 THEN1890
 1870 IF Y=39 AND Bhorse=4
THEN1890
 1880 IF I=39 AND Bhorse=5
THEN1890 ELSE 1920
 1890 PRINT'" ";Bname$;" wo
n and gets '";Bbet;" * ";P;
"='";Bbet*P:SOUND1,-15,200,
8
 1900 Bmoney=Bmoney+Bbet*P
 1910 Amoney=Amoney-Abet:GO
TO 1960
 1920 Bmoney=Bmoney-Bbet:Am
oney=Amoney-Abet
 1930 IF player=1 THENBmone
y=0
 1940 IF Amoney=0 AND Bmone
y=0 THEN PRINT'''" Oh dear,
 we seem to have lost all
    our money.Press <SPACE>
 to restart.":SOUND1,2,52,3
:SOUND1,0,0,4:SOUND1,2,32,8
:REPEATUNTILGET=32:GOTO 50
 1950 PRINT''"  The winner
wasn't picked,bad luck.
  Betting is a mugs game."
 1960 PRINTTAB(8,7)"<SPACE>
......Continue";TAB(8,9)"<E
SCAPE>......Restart"
 1970 REPEATUNTILGET=32
 1980 CLS:VDU28,0,13,39,0:C
LS:VDU26:VDU28,0,29,39,4:PR
OCscreen2
 1990 IF ERR=17 THEN RUN EL
SE MODE6:PRINT''':REPORT:PR
INT" at line ";ERL
```

This listing is included in this month's cassette tape offer. See order form on Page 53.

Never before have there been such money-saving offers for readers of a computer magazine!

EXPAND

your Electron

. . . for much, much less than the price you'd normally p

NEW STOCKS NOW IN!

How the Plus 1 helps you m the most of your Electron

With the Plus 1, you and your Electron enter a whole new computing dimension. The Plus 1 turns your Electron into a fully fledged micro capable of using printers, joysticks and cartridge ROMs – the software that comes on a chip. In addition, the Plus 1's analogue to digital port gives access to the outside world – while the slots for the ROM cartridges allow the Electron to take advantage of the latest, most exciting hardware developments yet to be released.

If you want to use your Electron to the full, then it's essential you get a Plus 1.

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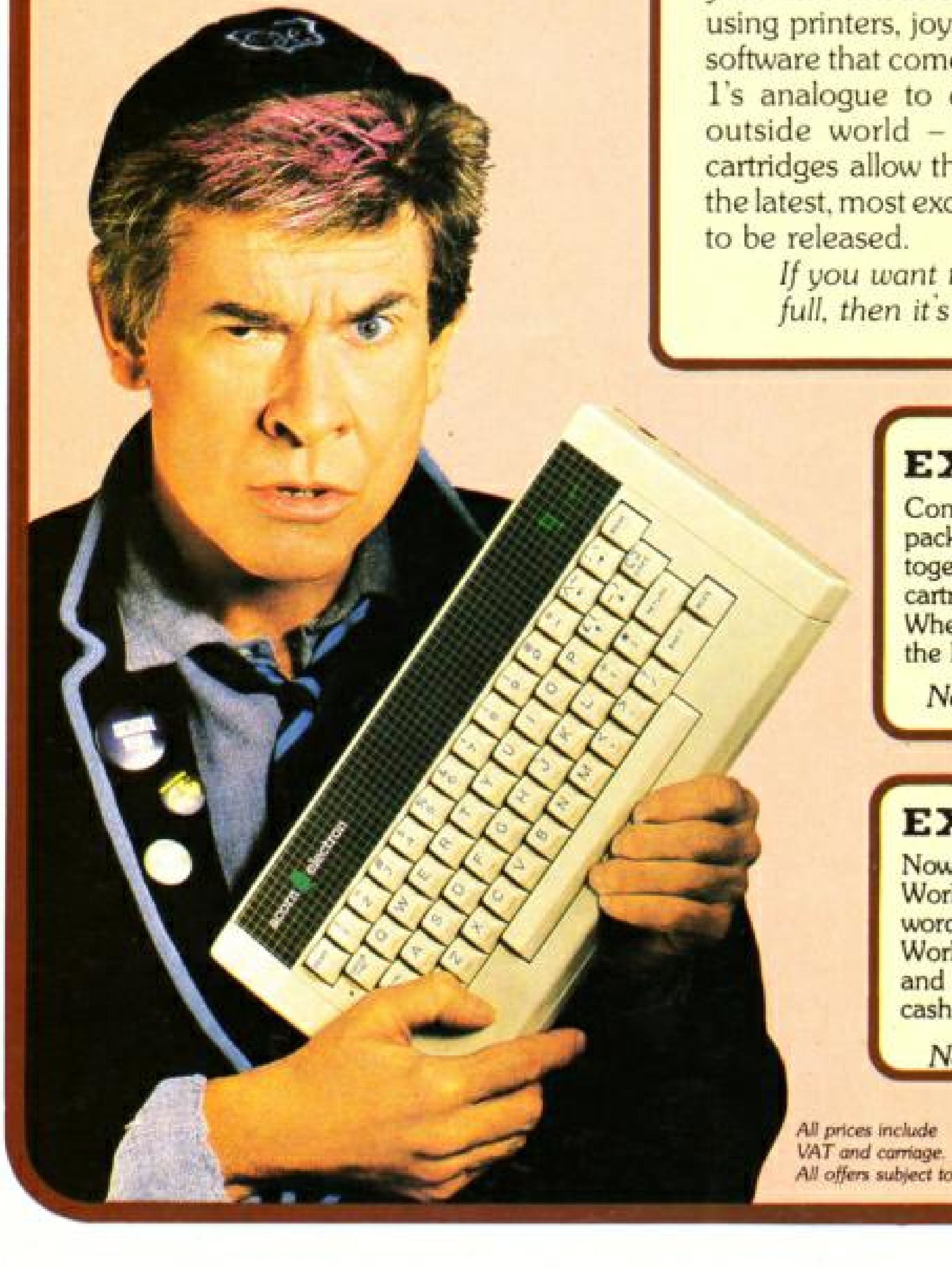
Speci for re Electr

£3

Inc. Fl ROM



EXPAND – *with the Electron Word*

Convert your Electron into a sophisticated word proces packed combination. The package consists of the versa together with View, Acorn's custom designed word proces cartridge and the many powerful capabilities of View become Whether you're writing a simple letter or your first novel – the Plus 1 make an unbeatable combination.

SAVE £32.85!

Normal price £82.80 **Electron User**

EXPAND – *with the Electron Wo*

Now you can transform your Electron into a serious micr Workstation. This package consists of a Plus 1 and wordprocessor and Viewsheet spreadsheet, both on car Workstation makes the Electron a hard-working yet inexpe and office. From business letters to a set of invoices, from h cash flow crises, it can take them all in its stride.

SAVE £59.8

Normal price £119.80 **Electron User**

All prices include VAT and carriage.
All offers subject to availability.

Please use the order form o

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artridge ROMs. The
ensive tool for home
home economics to

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on Page 53

EXPAND – *with the under-£100 Plus 3!*

SAVE £119.05!

The Plus 3 expansion unit provides you with a disc drive and disc interface in one compact unit. It consists of a single sided 80 track drive and ADFS, and can store up to 320k of data on each 3½in disc with no limit to the number of files. Expansion ports at the rear of the unit enable a Plus 1 to be added and a second drive can be attached which can be either 5¼in or 3½in, 40 or 80 track.

The Plus 3 comes complete with a Welcome disc packed full of games, demonstrations, utilities and help files, plus a 111 page manual containing everything you need to get you started right away.

Normal price £219.00 **Electron User price £99.95**

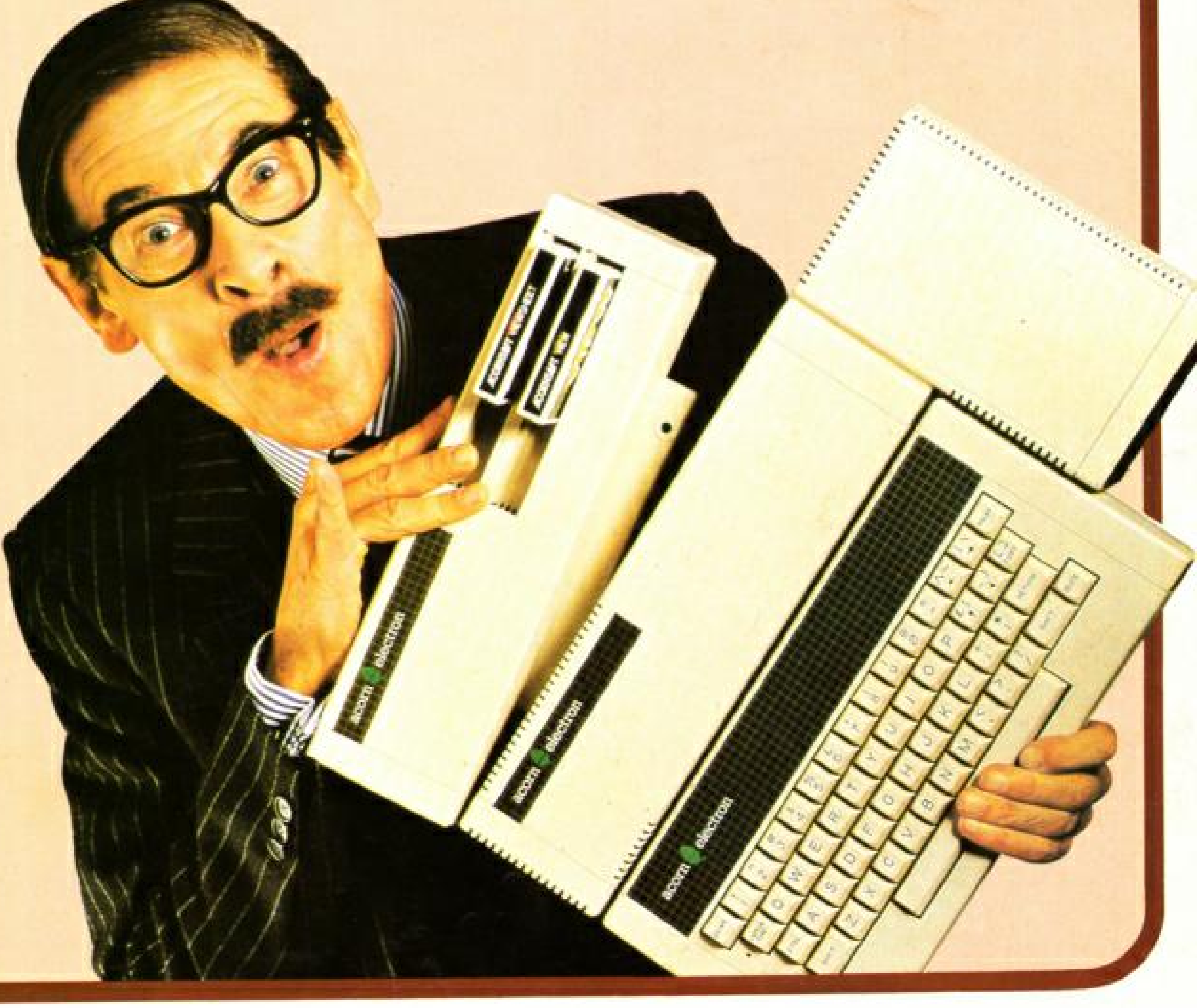
. . . or a Plus 3 PLUS Database!

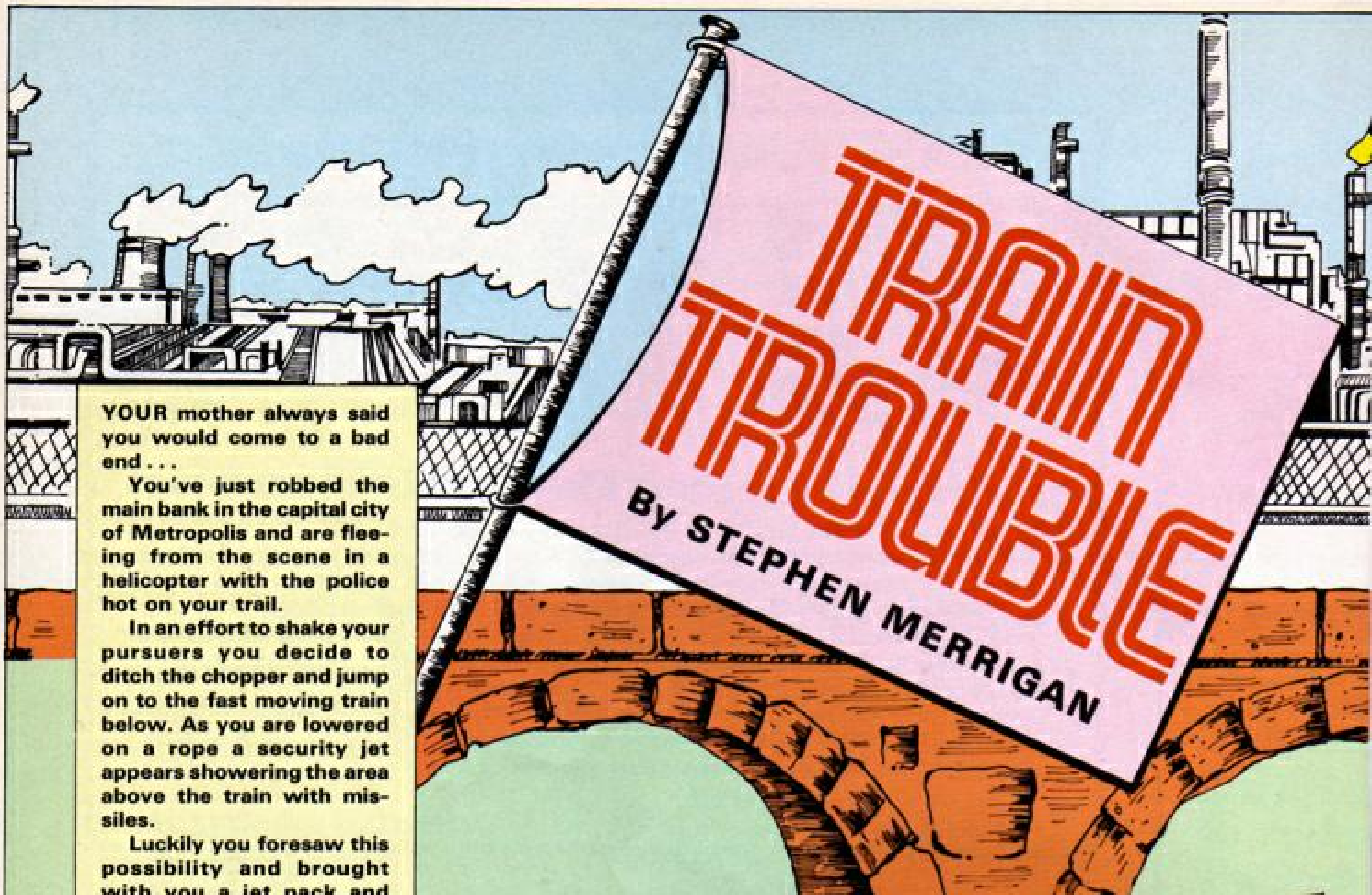
SAVE £134!

Bring the speed of discs and the organised memory of a powerful database to your Electron with the Electron Database combined with the Plus 3 disc drive, this dynamic duo should provide the answer to all your dataprocessing needs.

The database has all the facilities any normal user, home or business, would need. Yet – thanks to its menu-driven structure – it's simplicity itself to use. Records can be as varied as you require: You can have up to 32 fields ranging from 2 to over 200 characters in size. Once you've entered the records, information can be recovered with the minimum of fuss, sorting and searching over any number of fields. And when you've created your record structure you're not stuck with it: Field sizes can be changed at will. So, if your interested in keeping records, do yourself a favour: Upgrade to the Electron Database and let your micro do the work.

Normal price £248.95 **Electron User price £114.95**





TRAIN TROUBLE

By STEPHEN MERRIGAN

YOUR mother always said you would come to a bad end . . .

You've just robbed the main bank in the capital city of Metropolis and are fleeing from the scene in a helicopter with the police hot on your trail.

In an effort to shake your pursuers you decide to ditch the chopper and jump on to the fast moving train below. As you are lowered on a rope a security jet appears showering the area above the train with missiles.

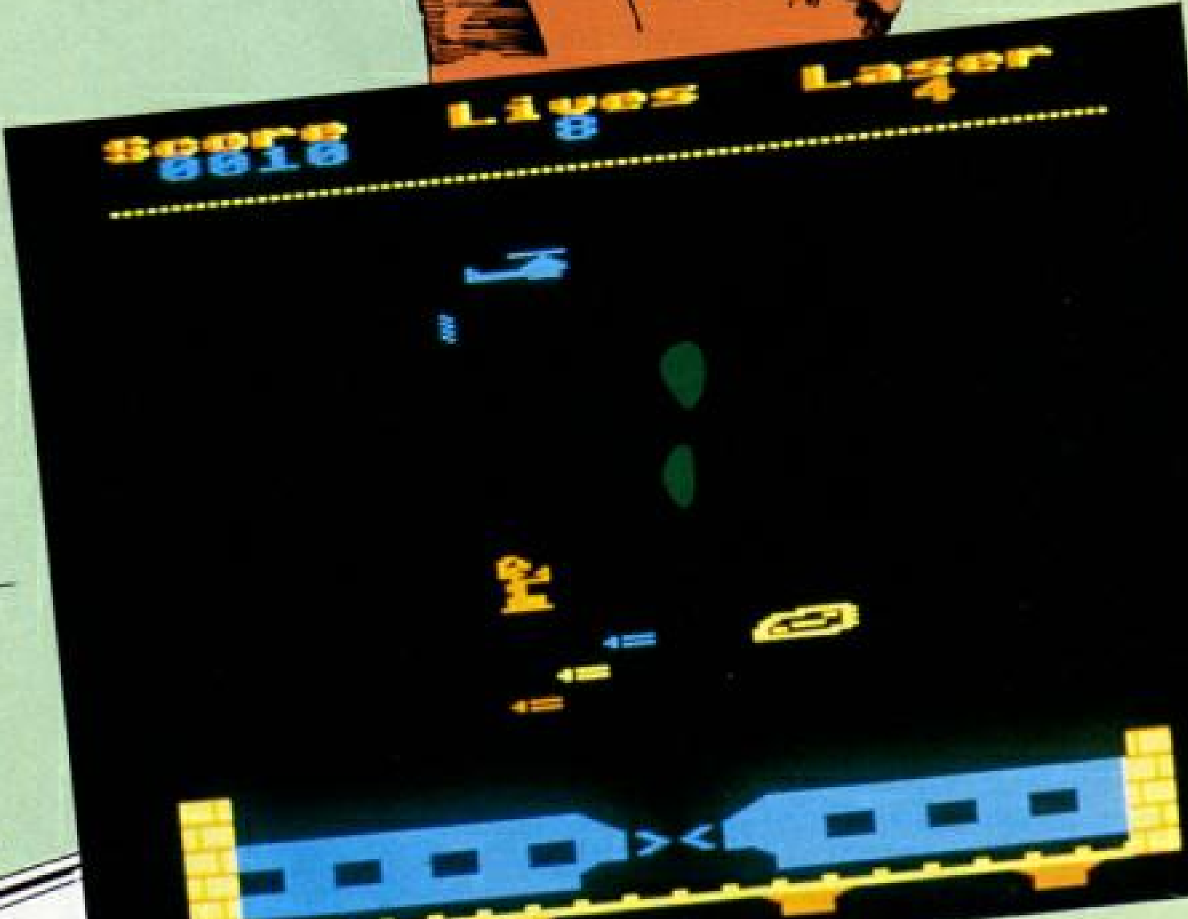
Luckily you foresaw this possibility and brought with you a jet pack and laser gun.

The jet pack will enable you to jump the gaps in between the carriages and dodge the missiles while a quick blast with the laser will see off a security jet.

Even so the situation is pretty hairy, so watch out and don't panic.

The keys used are:

Z = left
X = right
*** = up**
Return = fire

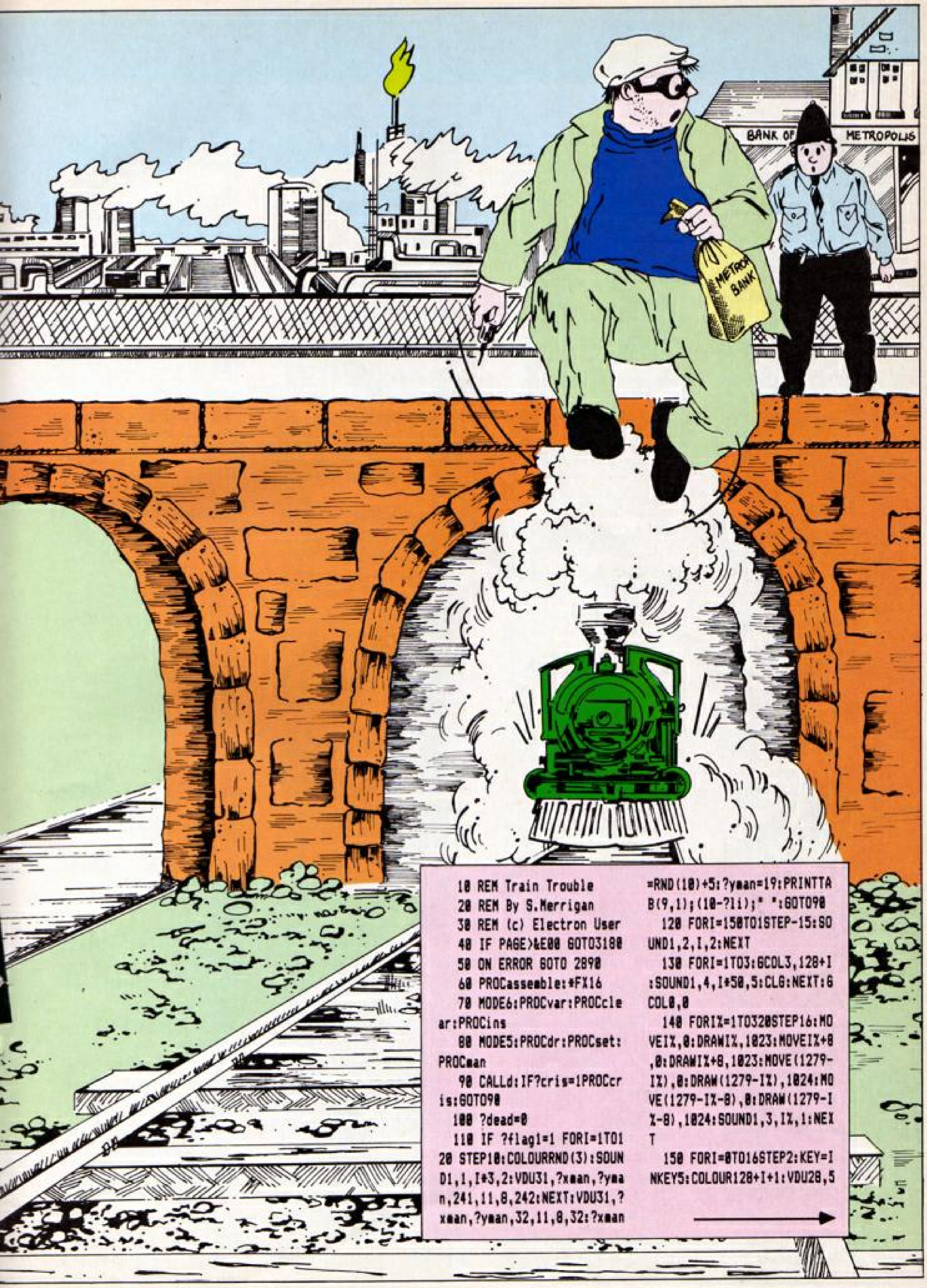


PROCEDURES

assemble	Assembles the machine code.
var	Sets up the variables and arrays.
ins	Prints the instructions.
hi–table	Prints the high score table.

VARIABLES

SC%	Score.
HI%	High score.
HI$	Name of high scorer.
Q%	Address of the machine code.



```
   10 REM Train Trouble
   20 REM By S.Merrigan
   30 REM (c) Electron User
   40 IF PAGE>&E00 GOTO3100
   50 ON ERROR GOTO 2890
   60 PROCassemble:*FX16
   70 MODE6:PROCvar:PROCclear:PROCins
   80 MODE5:PROCdr:PROCset:PROCman
   90 CALLd:IF?cris=1PROCcris:GOTO90
  100 ?dead=0
  110 IF ?flag1=1 FORI=1TO120 STEP10:COLOURRND(3):SOUND1,1,I*3,2:VDU31,?xman,?yman,241,11,8,242:NEXT:VDU31,?xman,?yman,32,11,8,32:?xman=RND(10)+5:?yman=19:PRINTTAB(9,1);(10-?li);" ":GOTO90
  120 FORI=150TO1STEP-15:SOUND1,2,I,2:NEXT
  130 FORI=1TO3:GCOL3,128+I:SOUND1,4,I*50,5:CLG:NEXT:GCOL0,0
  140 FORI%=1TO320STEP16:MOVEI%,0:DRAWI%,1023:MOVEI%+8,0:DRAWI%+8,1023:MOVE(1279-I%),0:DRAW(1279-I%),1024:MOVE(1279-I%-8),0:DRAW(1279-I%-8),1024:SOUND1,3,I%,1:NEXT
  150 FORI=0TO16STEP2:KEY=INKEY5:COLOUR128+I+1:VDU28,5
```

→

From Page 35

```
.(31-I),14,I:SOUND1,2,I*10,
2:CLS:NEXT
  160 FORI=16TO0STEP-2:KEY=
INKEY5:COLOUR128+I+1:VDU28,
5,(31-I),14,I:SOUND1,2,I*10
,2:CLS:NEXT
  170 TIME=0:REPEAT UNTIL T
IME>150
  180 SC%=1000*((?score AND
 &F0)DIV&10)+100*(?score AN
D&F)+10*((score?1 AND &F0)D
IV &10)+(score?1 AND &F)
  190 MODE6
  200 IF SC%>HI%(5)PROChi
  210 PROChi_table:GOTO80
  220 DEF PROCdr
  230 GCOL0,1:COLOUR2
  240 PRINTTAB(0,0);"Score"
;"  Lives";"  Laser";
  250 VDU5:MOVE-4,1023:PRIN
T"Score";"  Lives";"  Laser
";:VDU4
  260 GCOL3,2
  270 PRINTTAB(0,1);" 0000"
;"    10";"     0";
  280 MOVE0,930:PLOT21,1279
,930
  290 VDU19,3,col(RND(4));0
;0;0
  300 VDU23,1,0;0;0;0;:PRIN
T''
  310 COLOUR129
  320 X=0:FORI=30TO25STEP-1
:IF X=0 THEN X=1 ELSE X=0
  330 PRINTTAB(0,I);CHR$(24
3+X);TAB(19,I);CHR$(243+X);
:NEXT
  340 COLOUR128:PRINTTAB(1,
30);STRING$(18,CHR$237);TAB
(19,25);" "
  350 VDU17,1,31,0,31,227,2
24,228,9,9,227,224,228,9,9,
9,227,224,228,9,9,227,224,2
28
  360 ENDPROC
  370 DEF PROCvar
  380 VDU23,224,255,255,255
,255,255,255,255,255;23,225
,1,3,7,15,31,63,127,255
  390 VDU23,226,128,192,224
,240,248,252,254,255;23,227
,7,3,1,0,0,0,0,0
  400 VDU23,228,224,192,128
,0,0,0,0,0;23,229,96,208,15
2,248,225,243,33,63
  410 VDU23,230,112,112,48,
48,126,126,126,255;23,231,6
,15,25,31,135,207,132,252
  420 VDU23,232,14,14,12,12
,126,126,126,255;23,234,1,3
1,48,96,67,216,192,255
  430 VDU23,235,255,16,56,1
24,254,255,127,124;23,236,2
55,8,28,62,127,255,254,62
  440 VDU23,249,1,0,0,128,1
92,255,255,0;23,250,128,0,0
,1,3,255,255,0
  450 VDU23,238,16,8,16,8,1
6,8,16,8;23,239,0,0,0,95,19
2,95,0,0
  460 VDU23,242,56,124,84,8
4,124,56,40,40;23,243,0,251
,251,251,251,251,251,0
  470 VDU23,244,0,223,223,2
23,223,223,223,0;23,245,254
,3,26,3,226,3,14,248
  480 VDU23,241,146,214,108
,24,48,108,198,130
  490 VDU23,237,0,0,0,0,129
,129,255,255
  500 ENVELOPE1,3,-127,8,-8
,-1,-1,2,13,3,12,9,130,130
  510 ENVELOPE2,129,-15,-7,
-4,11,10,10,126,0,0,-126,12
6,126
  520 ENVELOPE3,1,5,-5,5,3,
4,5,126,0,0,-126,126,126
  530 ENVELOPE4,2,50,60,50,
2,3,4,126,0,0,-126,126,126
  540 VDU23,1;0;0;0;:CLS
  550 ENDPROC
  560 DEF PROCman:GCOL0,3:V
DU31,10,5,235,250:REPEAT:VD
U31,?xman,?yman,32,11,8,32:
?yman=?yman+1:VDU31,?xman,?
yman,?te,11,8,?te1:TIME=0:M
OVE672,400:DRAW672,(31-?yma
n)*32:MOVE672,(31-?yman+2)*
32:DRAW672,800:K=INKEY20:SO
UND1,1,?yman*7,4
  570 UNTIL ?yman=19:GCOL0,
0:MOVE672,400:DRAW672,800:G
COL3,2:ENDPROC
  580 DEF PROCassemble
  590 DIMHI%(7):DIMHI$(7):F
ORI=5TO1STEP-1:HI%(I)=10:HI
$(I)="STEVIE":NEXTI
  600 os=&FFEE:ob=&FFF4
  610 xman=&73:yman=&74
  620 flag=&77:flag1=&78
  630 te=&75:te1=&76
  640 li=&79
  650 xcraft=&7A:ycraft=&7B
  660 xmissile=&7C:ymissile
=&7D
  670 craftflag=&7E
  680 flag4=&7F
  690 xhel=&80
  700 flag5=&81
  710 flag6=&82
  720 char=&83
  730 flag9=&8A
  740 fuel=&88
  750 flag7=&86:flag8=&87
  760 num=&88:num1=&8C:num2
=&8D:num3=&8E
  770 score=&95:score1=&96
  780 yhel=&99
  790 speed=&91
  800 xcr1=&A0:xcr2=&A1:xcr
3=&A2
  810 ycr1=&A3:ycr2=&A4:ycr
3=&A5
  820 tag1=&A6:tag2=&A7:tag
3=&A8
  830 ?tag1=0:?tag2=0:?tag3
=0
  840 dead=&A9:?dead=0:cris
=&AA
  850 DIMcol(4):col(1)=2:co
l(2)=4:col(3)=6:col(4)=5
  860 DIMQ% 2000
  870 FORI=0TO2STEP2
  880 P%=Q%
  890 [OPTI
  900 .hx EQUW&11:EQUW2:EQU
W100:EQUW3
  910 .ix EQUW0:EQUW1:EQUW2
0:EQUW1
  920 .jx EQUW&11:EQUW3:EQU
W150:EQUW8
  930 .kx EQUW&11:EQUW1:EQU
W100:EQUW2
  940 .lx EQUW1:EQUW4:EQUW5
0:EQUW1
  950 .time EQUD 0:EQUB 0
  960 .time1 EQUD 0:EQUB 0
  970 .sy EQUW64:EQUW128:EQ
UW192:EQUW256:EQUW320:EQUW3
84:EQUW448:EQUW512:EQUW576:
EQUW640:EQUW704:EQUW768:EQU
W832:EQUW896:EQUW960:EQUW10
24:EQUN1088
  980 .tv EQUW160:EQUW192:E
QUW224:EQUW256:EQUW288:EQUW
320:EQUW352:EQUW384:EQUW416
:EQUW448
  990 .vy EQUB0:EQUB2:EQUB4
:EQUB6:EQUB8:EQUB10:EQUB12:
EQUB14:EQUB16:EQUB18:EQUB20
:EQUB22:EQUB24:EQUB26:EQUB2
8:EQUB30
 1000 .a EQUS" "+CHR$225+ST
RING$(14,CHR$224)+CHR$226+"
 "
 1010 .b EQUS"<"+CHR$224+CH
R$224+CHR$32+CHR$224+CHR$32
+CHR$224+CHR$32+CHR$224+CHR
$32+CHR$224+CHR$32+CHR$224+
CHR$32+CHR$224+CHR$32+CHR$2
24+">"
 1020 .c EQUS" "+CHR$227+ST
RING$(14,CHR$224)+CHR$228+"
 "
 1030 .d INCchar:LDAchar:CM
P#3:BEQnz:JSRmovecraft
 1040 .nz JSRoz
 1050 .xz LDAflag6:CMP#1:BN
Eyz:JMPzz
 1060 .yz
 1070 LDA#0:STAflag
 1080 LDA#17:JSRos:LDA#3:JS
Ros
 1090 LDAa:STA&70
 1100 LDAb:STA&71
 1110 LDAc:STA&72
 1120 LDX#0
 1130 .e
 1140 LDAa+1,X:STAa,X
 1150 LDAb+1,X:STAb,X
 1160 LDAc+1,X:STAc,X
 1170 INX:CPX#18:BNEe
 1180 LDA&70:STAa+17
 1190 LDA&71:STAb+17
 1200 LDA&72:STAc+17
 1210 LDX#0:LDA#31:JSRos:LD
A#1:JSRos:LDA#27:JSRos
 1220 .f LDAa,X:JSRos:INX:C
PX#18:BNEf
 1230 LDX#0:LDA#13:JSRos:LD
A#10:JSRos:LDA#9:JSRos
 1240 .f1 LDAb,X:JSRos:INX:
CPX#18:BNEf1
 1250 LDX#0:LDA#13:JSRos:LD
A#10:JSRos:LDA#9:JSRos
 1260 .f2 LDAc,X:JSRos:INX:
CPX#18:BNEf2
 1270 LDAyman:CMP#26:BEQy:J
MPg
 1280 .y LDA#1:CMPxman:BEQc
z:JSRx:DECxman:JSRp:LDAyman
:CMP#26:BNEq:JMPfx
 1290 .cz JMPaz
 1300 .fx LDX#lx MOD256:LDY
#lx DIV256:LDA#7:JSR&FFF1:L
DAfuel:SED:CLC:ADC#1:STAfue
l:CLD:JSRex
 1310 .g LDA&93:STAspeed:JS
Rwait
 1320 .iz LDA#129:LDY#&FF:L
```

```
DX#&9E:JSRob:CPY#&FF:BEQh
 1330 LDA#129:LDY#&FF:LDX#&
BD:JSRob:CPY#&FF:BEQi
 1340 .r LDA#129:LDY#&FF:LD
X#&B6:JSRob:CPY#&FF:BEQwy
 1350 .ax LDA#129:LDY#&FF:L
DX#&B7:JSRob:CPY#&FF:BEQk
 1360 .u LDA#31:JSRos:LDAxm
an:JSRos:LDXyman:INX:TXA:JS
Ros:LDA#135:JSRob:CPX#32:BE
Qv
 1370 .q LDAtag1:CMP#1:BNEq
1:JSRbomb1
 1380 .q1 LDAtag2:CMP#1:BNE
q2:JSRbomb2
 1390 .q2 LDAtag3:CMP#1:BNE
q3:JSRbomb3
 1400 .q3 INCflag:LDAflag:C
MP#2:BEQt:JMPg
 1410 .h JMPl
 1420 .i JMPm
 1430 .t JMPd
 1440 .k JMPo
 1450 .s JMPr
 1460 .v JMPw
 1470 .wy JMPuy
 1480 .p LDA#17:JSRos:LDA#1
:JSRos:LDA#31:JSRos:LDAxman
:JSRos:LDAyman:JSRos:LDAte:
JSRos:LDA#11:JSRos:LDA#8:JS
Ros:LDAte1:JSRos:RTS
 1490 .x LDA#31:JSRos:LDAxm
an:JSRos:LDAyman:JSRos:LDA#
32:JSRos:LDA#11:JSRos:LDA#8
:JSRos:LDA#32:JSRos:RTS
 1500 .m LDAxman:CMP#15:BEQ
s
 1510 JSRx:LDA#230:STAte:LD
A#229:STAte1:INCxman:JSRp:J
MPs
 1520 .l LDAxman:CMP#1:BEQs
 1530 JSRx:LDA#232:STAte:LD
A#231:STAte1:DECxman:JSRp:J
MPr
 1540 .o LDAyman:CMP#18:BEQ
mz:JSRx:DECyman:JSRp:LDX#ix
 MOD256:LDY#ix DIV256:LDA#7
:JSR&FFF1:JMPq
 1550 .mz JMPq
 1560 .w LDAyman:CMP#26:BPL
az:JSRx:INCyman:JSRp:JMPq
 1570 .az INCli:LDAli:CMP#1
0:BEQbz:LDA#1:STAflag1:RTS
 1580 .bz LDA#0:STAflag1:RT
S
 1590 .pz RTS
 1600 .qz LDA#31:JSRos:LDAx
hel:JSRos:LDAyhel:JSRos:LDA
#32:JSRos:LDA#32:JSRos:RTS
 1610 .oz INCflag4:LDAflag4
:CMP#4:BNEpz:LDA#0:STAflag4
 1620 .iy LDX#kx MOD256:LDY
#kx DIV256:LDA#7:JSR&FFF1
 1630 LDAflag6:CMP#1:BEQcy:
LDAxhel:STAxmissile:LDXyhel
:INX:STXymissile:LDA#1:STAf
lag6
 1640 .cy LDA#17:JSRos:LDA#
3:JSRos:JSRqz:LDAflag5:CMP#
1:BEQrz:JMPsz
 1650 .rz LDAxhel:CMP#17:BN
Etz:LDA#0:STAflag5:INCyhel:
LDAyhel:CMP#16:BEQhh:RTS
 1660 .tz INCxhel:LDA#31:JS
Ros:LDAxhel:JSRos:LDAyhel:J
SRos:LDA#249:JSRos:LDA#236:
JMPos
 1670 .sz LDAxhel:CMP#1:BNE
uz:LDA#1:STAflag5:INCyhel:L
DAyhel:CMP#16:BEQhh:RTS
 1680 .hh LDA#4:STAyhel:RTS
 1690 .uz DECxhel:LDA#31:JS
Ros:LDAxhel:JSRos:LDAyhel:J
SRos:LDA#235:JSRos:LDA#250:
JMPos
 1700 .ay LDA#31:JSRos:LDAx
missile:JSRos:LDAymissile:J
SRos:LDA#32:JSRos:RTS
 1710 .zz JSRay
 1720 LDXymissile:INX:LDA#3
1:JSRos:LDAxmissile:JSRos:T
XA:JSRos:LDA#135:JSRob
 1730 CPX#32:BNEby
 1740 INCymissile:LDA#31:JS
Ros:LDAxmissile:JSRos:LDAym
issile:JSRos:LDA#238:JSRos
 1750 LDXymissile:INX:LDA#3
1:JSRos:LDAxmissile:JSRos:T
XA:JSRos:LDA#135:JSRob
 1760 CPX#32:BNEby:JMPyz
 1770 .by JSRay:LDA#0:STAf1
ag6:CPX#133:BEQdy:CPX#135:B
EQdy:JMPyz
 1780 .dy JMPaz
 1790 .uy LDAte1:CMP#229:BE
Qbx:JMPax
 1800 .bx LDAfuel:CMP#0:BNE
gx:JMPax
 1810 .gx SED:SEC:LDAfuel:S
BC#1:STAfuel:CLD:JSRex
 1820 LDA#32:SEC:SBCyman:SE
C:SBC#5
 1830 TAX:LDAvy,X
 1840 TAX:LDAty,X:STAnum:LD
Aty+1,X:STAnum1
 1850 LDXxman:LDAvy,X
 1860 TAX:LDAsy,X:STAnum2:L
DAsy+1,X:STAnum3
 1870 LDY#0:STY&92
 1880 .xy LDA#25:JSRos:LDA#
4:JSRos
 1890 LDAnum2:JSRos:LDAnum3
:JSRos
 1900 LDAnum:JSRos:LDAnum1:
JSRos
 1910 LDA#25:JSRos:LDA#21:J
SRos
 1920 LDA#255:JSRos:LDA#4:J
SRos
 1930 LDAnum:JSRos:LDAnum1:
JSRos
 1940 LDX#3:STXspeed:JSRwai
t
 1950 INC&92:LDA&92:CMP#2:B
NExy
 1960 LDX#hx MOD256:LDY#hx
DIV256:LDA#7:JSR&FFF1
 1970 LDAyman:CMPycraft:BNE
go:LDAxcraft:CMPxman:BMIgo:
JSRcx:LDA#1:STAcris:RTS
 1980 .go LDXyman:DEX:CPXyc
raft:BNEgo1:LDAxcraft:CMPxm
an:BMIgo1:JSRcx:LDA#1:STAcr
is:RTS
 1990 .go1 JMPax
 2000 .cx
 2010 LDA#31:JSRos:LDA#1:JS
Ros:LDA#1:JSRos
 2020 SED:CLC:LDAscore1:ADC
#5:STAscore1
 2030 LDAscore:ADC#0:STAsco
re:CLD
 2040 LDAscore:LSR A:LSR A:
LSR A:LSR A
 2050 CLC:ADC#48:JSRos
 2060 LDAscore:AND#&0F
 2070 CLC:ADC#48:JSRos
 2080 LDAscore1:LSR A:LSR A
:LSR A:LSR A
 2090 CLC:ADC#48:JSRos
 2100 LDAscore1:AND#&0F
 2110 CLC:ADC#48:JMPos
 2120 .ex LDAfuel:CMP#6:BNE
waf:LDA#0:STAfuel
 2130 .waf LDA#31:JSRos:LDA
#16:JSRos:LDA#1:JSRos:LDAfu
el:AND#&0F:CLC:ADC#48:JMPos
 2140 .wait LDX#time MOD256
:LDY#time DIV256:LDA#2:JSR&
FFF1
 2150 .wait1 LDX#time1 MOD2
56:LDY#time1 DIV256:LDA#1:J
SR&FFF1
 2160 LDAtime1:CMPspeed:BMI
wait1
 2170 RTS
 2180 .movecraft
 2190 LDAxcraft:CMP#10:BMIt
ip
 2200 LDAtag1:CMP#0:BNEnip1
:LDA#1:STAtag1:LDXxcraft:DE
X:STXxcr1:LDAycraft:STAycr1
:JMPtip
 2210 .nip1 LDAtag2:CMP#0:B
NEnip2:LDA#1:STAtag2:LDXxcr
aft:DEX:STXxcr2:LDAycraft:S
TAycr2:JMPtip
 2220 .nip2 LDAtag3:CMP#0:B
NEtip:LDA#1:STAtag3:LDXxcra
ft:DEX:STXxcr3:LDAycraft:ST
Aycr3
 2230 .tip JSRhit_craft:LDA
dead:CMP#1:BNEcol:PLA:PLA:J
MPaz
 2240 .col LDA#17:JSRos:LDA
#2:JSRos:JSRerasecraft
 2250 .mc DECxcraft:LDAxcra
ft:CMP#0:BNEmovecraft1:LDA#
18:STAxcraft
 2260 .movecraft1 LDAcraftf
lag:CMP#0:BEQdown:JMPup
 2270 .down INCycraft:LDAyc
raft:CMP#26:BNEdown1:LDA#1:
STAcraftflag
 2280 .down1 JSRprintcraft:
JSRhit_craft:LDAdead:CMP#1:
BNEdown3:PLA:PLA:JMPaz
 2290 .down3 RTS
 2300 .up DECycraft:LDAycra
ft:CMP#18:BNEup1:LDA#0:STAc
raftflag
 2310 .up1 JSRprintcraft:JS
Rhit_craft:LDAdead:CMP#1:BN
Eup3:PLA:PLA:JMPaz
 2320 .up3 RTS
 2330 .erasecraft LDA#31:JS
Ros:LDAxcraft:JSRos:LDAycra
ft:JSRos:LDA#32:JSRos:LDA#3
2:JMPos
 2340 .printcraft LDA#31:JS
Ros:LDAxcraft:JSRos:LDAycra
ft:JSRos:LDA#234:JSRos:LDA#
245:JMPos
```

→

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```
 2350 .bomb1 LDA#17:JSRos:L
DA#1:JSRos:LDXxcr1:LDYycr1:
JSRwipe:JSRdeath:LDAdead:CM
P#1:BNEmob1:PLA:PLA:JMPaz
 2360 .mob1 DECxcr1:LDAxcr1
:CMP#1:BNEbom1:LDA#0:STAtag
1:LDXxcr1:LDYycr1:JSRwipe:R
TS
 2370 .bom1 LDXxcr1:LDYycr1
:JSRreprint:JSRdeath:RTS
 2380 .bomb2 LDA#17:JSRos:L
DA#2:JSRos:LDXxcr2:LDYycr2:
JSRwipe:JSRdeath:LDAdead:CM
P#1:BNEmob2:PLA:PLA:JMPaz
 2390 .mob2 DECxcr2:LDAxcr2
:CMP#1:BNEbom2:LDA#0:STAtag
2:LDXxcr2:LDYycr2:JSRwipe:R
TS
 2400 .bom2 LDXxcr2:LDYycr2
:JSRreprint:JSRdeath:RTS
 2410 .bomb3 LDA#17:JSRos:L
DA#3:JSRos:LDXxcr3:LDYycr3:
JSRwipe:JSRdeath:LDAdead:CM
P#1:BNEmob3:PLA:PLA:JMPaz
 2420 .mob3 DECxcr3:LDAxcr3
:CMP#1:BNEbom3:LDA#0:STAtag
3:LDXxcr3:LDYycr3:JSRwipe:R
TS
 2430 .bom3 LDXxcr3:LDYycr3
:JSRreprint:JSRdeath:RTS
 2440 .wipe LDA#31:JSRos:TX
A:JSRos:TYA:JSRos:LDA#32:JM
Pos
 2450 .reprint LDA#31:JSRos
:TXA:JSRos:TYA:JSRos:LDA#23
9:JMPos
 2460 .death LDA#8:JSRos:LD
A#8:JSRos:LDA#135:JSRob:CPX
#133:BEQdeath1:CPX#134:BEQd
eath1:CPX#135:BEQdeath1:CPX
#136:BEQdeath1:RTS
 2470 .death1 LDA#1:STAdead
:RTS
 2480 .hit_craft LDA#31:JSR
os:LDAxcraft:JSRos:LDAycraf
t:JSRos:LDA#9:JSRos:LDA#10:
JSRos:LDA#135:JSRob:CPX#133
:BEQkil:CPX#134:BEQkil:CPX#
135:BEQkil:CPX#136:BEQkil
 2490 LDA#11:JSRos:LDA#11:J
SRos:LDA#135:JSRob:CPX#133:
BEQkil:CPX#134:BEQkil:CPX#1
35:BEQkil:CPX#136:BEQkil
 2500 LDA#8:JSRos:LDA#8:JSR
os:LDA#10:JSRos:LDA#135:JSR
ob:CPX#133:BEQkil:CPX#134:B
EQkil:CPX#135:BEQkil:CPX#13
6:BEQkil
 2510 RTS
 2520 .kil LDA#1:STAdead:RT
S
 2530 ]
 2540 NEXT
 2550 ENDPROC
 2560 DEF PROCclear:FORI=&7
0TO&AA:?I=0:NEXT:ENDPROC
 2570 DEF PROCset
 2580 RESTORE
 2590 FORI=0TO30:READA:?(&7
3+I)=A:NEXT
 2600 !score=0:?yhel=5
 2610 ENDPROC
 2620 DATA10,7,230,229,0,0,
0,18,23,17,0,0,0,10,0,0,0,5
,1,0,0,0,23,0,0,0,0,0,0,0,1
0
 2630 DEF PROChi
 2640 *FX15,0
 2650 A$=""
 2660 PRINTTAB(8,5);"You ar
e in the top 5";TAB(8,6);"-
--------------------";TAB(7,
10);"Please enter your name
";TAB(13,13);"----------";T
AB(13,12);
 2670 W%=(POS+10):REPEAT:*F
X15,1
 2680 KEY=GET:SOUND1,1,50,1
 2690 IF POS>=13 AND POS<W%
 AND KEY<>127 PRINT;CHR$KEY
;:A$=A$+CHR$KEY
 2700 IF KEY=127 AND POS<>1
3 VDU127:A$=A$+CHR$127
 2710 IF POS=13 A$=""
 2720 UNTIL INKEY-74
 2730 HI$(7)=A$:HI%(7)=SC%
 2740 FORI=5TO1STEP-1:IF HI
%(7)>HI%(I)PROCswap
 2750 NEXT:ENDPROC
 2760 DEF PROCswap
 2770 HI%(I+1)=HI%(I):HI$(I
+1)=HI$(I)
 2780 HI%(I)=HI%(7):HI$(I)=
HI$(7)
 2790 ENDPROC
 2800 DEF PROChi_table
 2810 PRINTTAB(10,0);"TODAY
'S HI SCORES";TAB(4,2);STRI
NG$(28,"*"):VDU23,1,0;0;0;0
;
 2820 FORI=0TO16:PRINTSPC(4
);"*";STRING$(26," ");"*":N
EXT
 2830 PRINTTAB(4);STRING$(2
8,"*")
 2840 FORI=3TO15STEP3:PRINT
TAB(9,2+I);I/3;") ";HI$(I/3
);TAB(24,2+I);HI%(I/3)
 2850 NEXT
 2860 PRINTTAB(14,23);"PRES
S SPACE"
 2870 REPEAT UNTIL INKEY-99
 2880 ENDPROC
 2890 MODE6:IF ERR=17 RUN
 2900 VDU7
 2910 REPORT:PRINT" at line
 ";ERL
 2920 END
 2930 DEF PROCins:VDU19,1,0
;0;0;0
 2940 PRINTSPC(13);"TRAIN T
ROUBLE"'SPC(13);"----------
---"
 2950 PRINT'" You have just
  robbed  a bank and with"'
"the  aid  of  a  friend  h
ave   escaped"'"successfull
y in  his helecopter . Afte
r"'"giving him a  share of
the loot you are"'"lowered
 from  the  helicopter by
rope"
 2960 PRINT"onto a fast  mo
ving  train.  Where  you"'"
discover  your  FRIEND  has
 snitched on"'"you. Suddenl
y a  police  fighter  plane
"'"appears  letting  loose
 a  barage   of"'"misiles o
n each pass."
 2970 PRINT" Just then in d
espairation you remember"'"
you  have a  jetpack with y
ou.  Dodging"'"missiles and
 fighter craft should prove
"'"to be no trouble now."
 2980 PRINT" Another handy
tool you have along with"'"
you is your trusty laser. T
he laser usesup fuel so eac
h  time  you land on the.."
 2990 PRINTTAB(14,23);"PRES
S SPACE";:VDU20:REPEAT UNTI
L INKEY-99
 3000 VDU19,1,0;0;0;0:CLS:P
RINTTAB(12);"TRAIN TROUBLE"
'TAB(12);"-------------";
 3010 PRINT''"- train  you
 tap  into  its  supplies."
'"Remember only five units
of fuel may be"'"gathered a
t a time."
 3020 PRINT" On watching  t
he  events  taking place"'"
below  the  helicopter pilo
t decides to"'"help  the fi
ghter  plane. Watch out for
"'"his bombs."
 3030 PRINT'" Your keys are
-"
 3040 PRINT'SPC(10)"Z - lef
t   X - right"
 3050 PRINTSPC(18)"*-up"''S
PC(12)"<RETURN> -fire"
 3060 VDU20
 3070 PRINTTAB(5,18)"LEVEL
( 0-5 ) ";:KEY=GET:IF KEY<4
8OR KEY>53 GOTO 3070 ELSE?&
93=5-(KEY-48):PRINT;KEY-48;
 3080 SOUND1,3,130,10
 3090 PRINTTAB(5,20)"SOUND
( Y/N ) ";:KEY$=GET$:IF KEY
$<>"Y" AND KEY$<>"N" GOTO 3
090
 3100 IF KEY$="Y" PRINT"Yes
";:*FX210,0
 3110 IF KEY$="N" PRINT"No"
;:*FX210,1
 3120 SOUND1,3,130,10
 3130 PRINTTAB(14,23)"PRESS
 SPACE";:REPEAT UNTIL INKEY
-99
 3140 ENDPROC
 3150 DEFPROCcris:?cris=0:A
%=?xcraft*64+64:B%=(32-?ycr
aft)*32-16:FORI%=0TO56STEP8
:MOVEA%-I%,B%+I% DIV4:DRAWA
%-I%,B%-I% DIV4:DRAWA%+I%,B
%-I% DIV4:DRAWA%+I%,B%+I% D
IV4:DRAWA%-I%,B%+I% DIV4:SO
UND1,-15,150-I%,1:GCOL0,RND
(3):NEXT
 3160 GCOL0,0:FORI%=64TO0ST
EP-8:MOVEA%-I%,B%+I% DIV4:D
RAWA%-I%,B%-I% DIV4:DRAWA%+
I%,B%-I% DIV4:DRAWA%+I%,B%+
I% DIV4:DRAWA%-I%,B%+I% DIV
4:SOUND1,-15,150-I%,1:NEXT
 3170 GCOL3,2:?xcraft=17:?y
craft=20+RND(5):ENDPROC
 3180 *K.0 *T.|MD%=PA.-&E00
:F.I%=PA. TO TOP S.4:!(I%-D
%)=!I%:N.:PAGE=&E00:!(TOP-D
%)=&FF0D|MOLD|MRUN|M
 3190 *FX138,0,128
```

This listing is included in this month's cassette tape offer. See order form on Page 50.

TITION.. COMPETITION.. COMPE

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Slogger is four years old this month. To celebrate its birthday, the company is giving away a big bundle of products to thank Electron owners for their support.

WHAT YOU HAVE TO DO

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Think up a sentence in which the initial letters make up the word SLOGGER. It should relate to computing, of course. You can use additional words such as and, or, of, for and others to connect your words together.

Cut out or photocopy the entry form and send it to the address below. The prizes will go to the best 15 entries opened on November 31.

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MACRO BASIC COMPILER

Improve the performance of your programs by employing this Basic-to-machine code interpreter by ROLAND WADDILOVE

AS many of you already know the 6502 microprocessor at the heart of your Electron only understands machine code and can make neither head nor tail of a Basic program.

So when you enter and run a Basic program the Basic rom takes each line and converts it into machine code which the 6502 can then execute.

The Basic rom is an interpreter, and Basic is known as an interpreted language.

The process of interpreting each line of Basic every time it is executed is time consuming, so such programs tend to run slower than languages like Forth, Pascal and C.

It would be much better if the program could be interpreted and the resultant code stored somewhere in memory.

Then it could be run directly without the need to be interpreted, with a consequent improvement in performance.

If you wanted to explain something to a Frenchman it would obviously be quicker to tell him in French rather than tell an interpreter in English who converted it to French and then told the Frenchman.

A Basic compiler is designed to take a Basic program and convert it into machine code. This converted or compiled program will run several times faster than the original, since there's no need for it to be interpreted.

Basic compilers are difficult to write and there are usually many restrictions such as integer maths only. This means that you can't use SIN, COS, LOG and so on.

This Macro Basic Compiler isn't really a true Basic compiler. I've cheated and used the built-in assembler's ability to handle macros.

A macro is a chunk of code which is given a label. That label can be used in your program and whenever the assembler comes across it, it inserts the chunk of code.

So you could give a long complicated piece of code the name *fred* and simply enter *fred* every time you needed that code. It saves a lot of typing.

So what I've done is to write as many Basic commands as possible in machine code in the form of macros.

This will enable you to write a program in a form similar to Basic which can be compiled to machine code.

In fact with a bit of practice anyone can write fast machine code programs without the slightest knowledge of 6502 code. For instance in Basic you would write:

```
CLS
PRINT "Hello!"
SOUND 1,-15,10,10
```

and using the Macro Basic Compiler:

```
OPT FNcls
OPT FNprint("Hello!")
OPT FNsound(1,-15,10,10)
```

Although not identical I'm sure you can see the similarities, and the new commands shouldn't cause any difficulty.

To make it easier to read each command is in lower case preceded by OPT FN. This is a feature of macros. And if the command requires parameters they must be placed within brackets.

Table I lists all the commands, and lines 1000 to 1330 of the compiler show how each is used. These lines aren't needed and should be deleted.

Some commands are fairly straightforward while others require a little knowledge of machine code. To show you how to use the compiler here is a short program in ordinary Basic:

```
10 MODE 5
20 COLOUR 2
30 PRINT TAB(6,15);
40 PRINT "Electron";
50 GCOL 0,1
60 MOVE 350,450
70 DRAW 980,450
80 SOUND 1,-15,5,5
90 END
```

and in Macro Basic:

```
100 OPT FNmode(5)
110 OPT FNcolour(2)
120 OPT FNtab(6,15)
130 OPT FNprint("Electron")
140 OPT FNgcol(0,1)
150 OPT FNmove(350,450)
160 OPT FNdraw(980,450)
170 OPT FNsound(1,-15,5,5)
180 OPT FNend
```

The compiler leaves lines 100 to 4999 free for your program so the Macro Basic listing starts at line 100.

These lines should be entered into the compiler listing. Don't forget to enter:

```
DELETE 100,4999
```

to remove any previous program before entering a new one, and always include OPT FNend at the end. Run it to compile the program and CALL &900 to run the compiled version.

All the commands we've seen so far can be used without any knowledge of machine code.

However some do require additional code, and have been included to make writing in machine code as simple as possible.

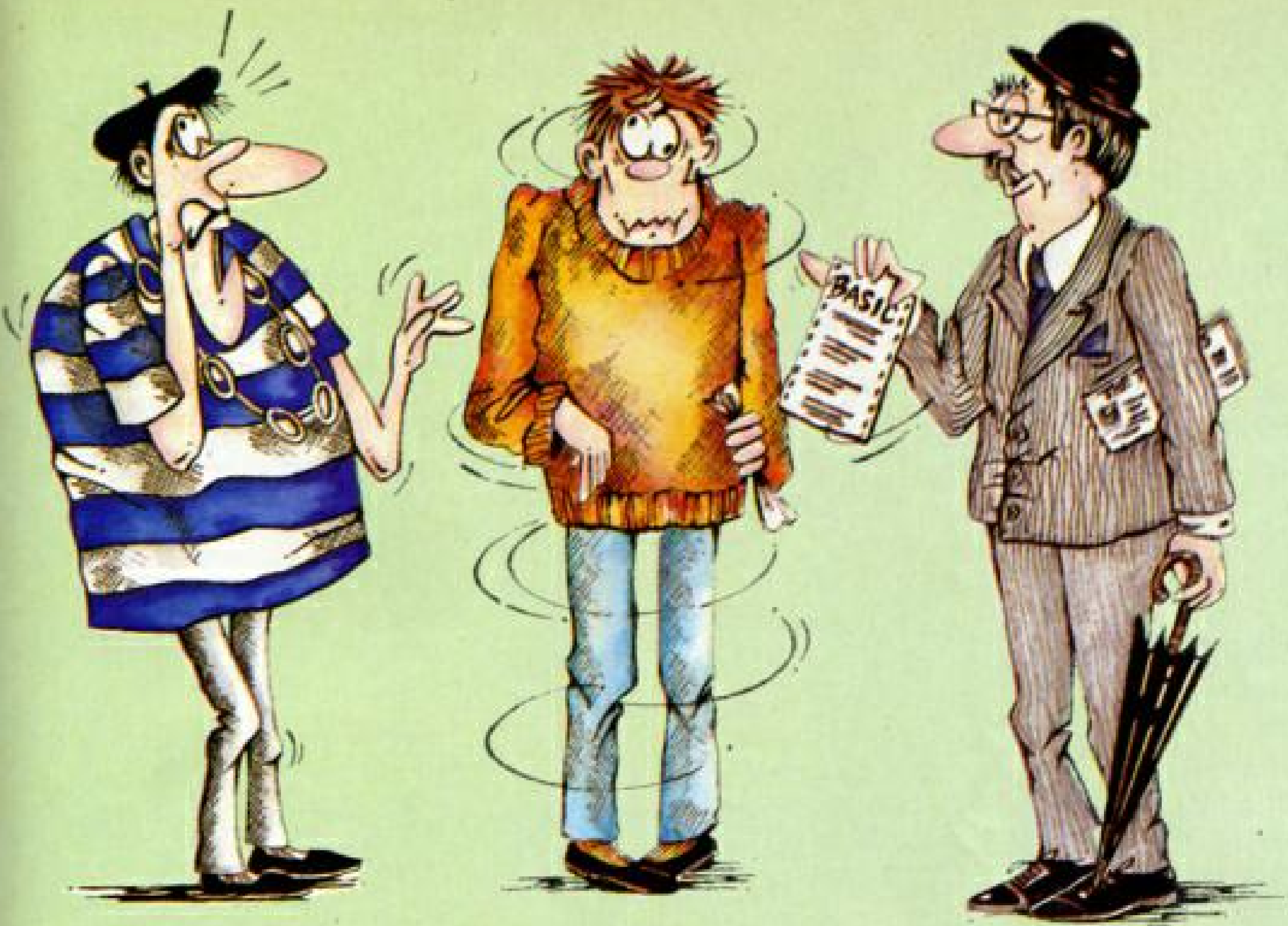
For instance inkey(-66) tests key -66, the A key, and sets the Zero flag if it is not pressed. So you would use:

```
OPT FNinkey(-66)
BEQ not_pressed
\pac man up
.not_pressed
\rest of program
```

Inkey can be used with a positive number as in Basic, so inkey(1000) will wait 10 seconds for a key. If one is pressed the Ascii value is returned in X if the Zero flag is set.

```
OPT FNinkey(1000)
BNE not_pressed
CPX #13
BNE not_return
\rest of code
```

Point returns the colour of the pixel tested in the A



- adval
- call
- cls
- clg
- colour
- draw
- envelope
- end
- gcol
- get
- inkey (+)
- inkey (–)
- input
- mode
- move
- oscli
- plot
- point
- print
- pos
- vpos
- rnd
- sound
- spc
- strings
- tab
- settime
- readtime
- vdu
- fx
- times
- divide
- plus
- minus

Table I:The Macro Basic Compiler commands

register. To check whether a pixel is red:

```
OPT FNpoint(100,200)
CMP #1
BNE not_red
OPT FNgcol(0,0)  \erase it!
OPT FNplot(69,100,200)
.not_red
\rest of code
```

Rnd returns a random number in X and Y, low byte/high byte. **Pos** and **vpos** return in X and Y the coordinates of the text cursor.

Envelope is the same as in Basic except that the last six parameters, which should be set to 126,0,0, – 126,126,126 on the Electron, aren't required. They are set automatically.

Mode doesn't alter HIMEM and is the same as VDU 22,*mode* in Basic.

Get is the same as Basic and returns the key pressed in the A register. **Input** is quite different though. You have to say where in memory you want the input stored and how many characters to input.

Use **Oscli** for all star commands, so to catalog the disc use:

```
OPT FNoscli("*CAT")
```

> ***"If you want to explain something to a Frenchman it would be quicker to tell him in French rather than tell an interpreter in English who converted it to French and then told the Frenchman"***

Since FX commands are so common **fx** has been included as a command. Always provide three parameters setting any unused parameters to zero:

```
*FX19
```

becomes:

```
OPT FNfx(19,0,0)
```

Maths is always difficult in machine code, so to make it as simple as possible I've provided **plus**, **minus**, **times** and **divide**. All the routines use 16 bit integer maths with the numbers stored low byte/high byte as normal.

Plus requires three addresses – the number at the second is added to the first and the result placed in the third.

Minus is similar, the number at the second address is subtracted from the first and the result placed in the third.

Times multiplies the first by the second and places the result in the third. **Divide** is different however, only two addresses are required.

The number at the first is divided by the second and the quotient placed back in the first with the remainder in the second. It is Basic's DIV and MOD combined.

So to divide the number at &70 by the number at &72 use:

```
OPT FNdivide(&70,&72)
```

The answer is placed in &70, and &72 is the remainder.

```
OPT FNtimes(&70,&72,&74)
```

will multiply &70 by &72 and store the answer at &74.

Obviously these routines will only be required by the more experienced machine code programmer.

As you've seen writing machine code needn't be a painful experience if you go about it in the right way.

Now even complete novices can write such programs with the aid of this Macro Basic Compiler. ■

Compiler listing

```
   10 REM Macro  Basic
   20 REM   Compiler
   30 REM By R.A.Waddilove
   40 MODE 6
   50 PRINT'"Macro BASIC Co
mpiler"
   60 FOR pass=0 TO 2 STEP
2
   70 P%=&900
   80 IF pass=2 PRINT'"Star
t...&";~P%
   90 [OPT pass
 1000 OPT FNadval(0)
 1010 OPT FNcall(&C00)
 1020 OPT FNcls
 1030 OPT FNclg
 1040 OPT FNcolour(1)
 1050 OPT FNdraw(300,400)
 1060 OPT FNenvelope(1,129,
1,2,3,5,5,5)
 1070 OPT FNend
 1080 OPT FNgcol(0,1)
 1090 OPT FNget
 1100 OPT FNinkey(320)
 1110 OPT FNinkey(-66)
 1120 OPT FNinput(&C00,128)
 1130 OPT FNmode(6)
 1140 OPT FNmove(200,300)
 1150 OPT FNoscli("KEY0 MOD
E6|MLIST|M")
 1160 OPT FNplot(22,400,500
)
 1170 OPT FNpoint(100,200)
 1180 OPT FNprint("Hello!")
 1190 OPT FNpos
 1200 OPT FNvpos
 1210 OPT FNrnd(500)
 1220 OPT FNsound(&11,-15,1
00,10)
 1230 OPT FNspc(10)
```

→

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```
 1240 OPT FNstrings(25,"A")
 1250 OPT FNtab(10,20)
 1260 OPT FNsettime(0)
 1270 OPT FNreadtime
 1280 OPT FNvdu(7)
 1290 OPT FNfx(19,0,0)
 1300 OPT FNtimes(&70,&72,&
74)
 1310 OPT FNdivide(&70,&72)
 1320 OPT FNplus(&70,&72,&7
4)
 1330 OPT FNminus(&70,&72,&
74)
 5000 ]
 5010 NEXT
 5020 PRINT"End.....&";~P%
 5030 END
 5040
 5050 REM **** Macros ****
 5060 DEF FNfx(A%,X%,Y%)
 5070 [OPT pass:LDA #A%:LDX
#X%:LDY #Y%:JSR &FFF4:]
 5080 =pass
 5090
 5100 DEF FNcall(A%)
 5110 [OPT pass:JSR A%:]
 5120 =pass
 5130
 5140 DEF FNcls
 5150 [OPT pass:LDA #12:JSR
&FFEE:]
 5160 =pass
 5170
 5180 DEF FNclg
 5190 [OPT pass:LDA #16:JSR
&FFEE:]
 5200 =pass
 5210
 5220 DEF FNcolour(A%)
 5230 [OPT pass:LDA #17:JSR
&FFEE:LDA #A%:JSR &FFEE:]
 5240 =pass
 5250
 5260 DEF FNdraw(X%,Y%)
 5270 [OPT pass
 5280 LDA #25:JSR &FFEE
 5290 LDA #5:JSR &FFEE
 5300 LDA #X%MOD256:JSR &FF
EE:LDA #X%DIV256:JSR &FFEE
 5310 LDA #Y%MOD256:JSR &FF
EE:LDA #Y%DIV256:JSR &FFEE
 5320 ]
 5330 =pass
 5340
 5350 DEF FNenvelope(A%,B%,
C%,D%,E%,F%,G%,H%)
 5360 [OPT pass
 5370 JMP P%+17
 5380 .env1
 5390 EQUB A%:EQUB B%:EQUB
C%:EQUB D%:EQUB E%:EQUB F%:
EQUB G%:EQUB H%
 5400 EQUB 126:EQUB 0:EQUB
0:EQUB -126:EQUB 126:EQUB 1
26
 5410 LDA #8:LDX #env1 MOD2
56:LDY #env1 DIV256:JSR &FF
F1
 5420 ]
 5430 =pass
 5440
 5450 DEF FNgcol(X%,Y%)
 5460 [OPT pass:LDA #18:JSR
&FFEE:LDA #X%:JSR &FFEE:LD
A #Y%:JSR &FFEE:]
 5470 =pass
 5480
 5490 DEF FNget
 5500 [OPT pass:JSR &FFE0:]
 5510 =pass
 5520
 5530 DEF FNinkey(A%)
 5540 IF A%<0 THEN [OPT pas
s:LDA #129:LDX #A%+256:LDY
#&FF:JSR &FFF4:TYA:] ELSE [
OPT pass:LDA #129:LDX #A%MO
D256:LDY #A%DIV256:JSR &FFF
4:TYA:]
 5550 =pass
 5560
 5570 DEF FNinput(B%,L%)
 5580 [OPT pass
 5590 JMP P%+8
 5600 .osblock
 5610 EQUW B%:EQUB L%:EQUB
32:EQUB 126
 5620 LDA #0:LDX #osblock M
OD256:LDY #osblock DIV256:J
SR &FFF1
 5630 ]
 5640 =pass
 5650
 5660 DEF FNmode(M%)
 5670 [OPT pass:LDA #22:JSR
&FFEE:LDA #M%:JSR &FFEE:]
 5680 =pass
 5690
 5700 DEF FNmove(X%,Y%)
 5710 [OPT pass
 5720 LDA #25:JSR &FFEE
 5730 LDA #4:JSR &FFEE
 5740 LDA #X%MOD256:JSR &FF
EE:LDA #X%DIV256:JSR &FFEE
 5750 LDA #Y%MOD256:JSR &FF
EE:LDA #Y%DIV256:JSR &FFEE
 5760 ]
 5770 =pass
 5780
 5790 DEF FNoscli(command$)
 5800 [OPT pass
 5810 JMP P%+4+LEN(command$
)
 5820 .osblock
 5830 EQUS command$:EQUB &0
D
 5840 LDX #osblock MOD256:L
DY #osblock DIV256:JSR &FFF
7
 5850 ]
 5860 =pass
 5870
 5880 DEF FNplot(A%,X%,Y%)
 5890 [OPT pass
 5900 LDA #25:JSR &FFEE
 5910 LDA #A%:JSR &FFEE
 5920 LDA #X%MOD256:JSR &FF
EE:LDA #X%DIV256:JSR &FFEE
 5930 LDA #Y%MOD256:JSR &FF
EE:LDA #Y%DIV256:JSR &FFEE
 5940 ]
 5950 =pass
 5960
 5970 DEF FNpoint(X%,Y%)
 5980 [OPT pass
 5990 JMP P%+8
 6000 .osblock
 6010 EQUW X%:EQUW Y%:EQUB
0
 6020 LDA #9:LDX #osblock M
OD256:LDY #osblock DIV256:J
SR &FFF1
 6030 LDA osblock+4
 6040 ]
 6050 =pass
 6060
 6070 DEF FNprint(string$)
 6080 [OPT pass
 6090 JMP P%+4+LEN(string$)
 6100 .string
 6110 EQUS string$:EQUB 0
 6120 LDY #0
 6130 .psl
 6140 LDA string,Y:BEQ P%+8
 6150 JSR &FFEE:INY:BNE psl
 6160 ]
 6170 =pass
 6180
 6190 DEF FNpos
 6200 [OPT pass:LDA #134:JS
R &FFF4:]
 6210 =pass
 6220
 6230 DEF FNvpos
 6240 [OPT pass:LDA #134:JS
R &FFF4:]
 6250 =pass
 6260
 6270 DEF FNrnd(A%)
 6280 [OPT pass
 6290 LDA #A%MOD256:STA &2A
:LDA #A%DIV256:STA &2B:LDA
#0:STA &2C:STA &2D
 6300 JSR &AF12
 6310 LDX &2A:LDY &2B
 6320 ]
 6330 =pass
 6340
 6350 DEF FNsound(A%,B%,C%,
D%)
 6360 [OPT pass
 6370 JMP P%+11
 6380 .osblock
 6390 EQUW A%:EQUW B%:EQUW
C%:EQUW D%
 6400 LDA #7:LDX #osblock M
OD256:LDY #osblock DIV256:J
SR &FFF1:]
 6410 =pass
 6420
 6430 DEF FNspc(A%)
 6440 [OPT pass:LDA #32:LDY
#A%:.L% JSR &FFEE:DEY:BNE
L%:]
 6450 =pass
 6460
 6470 DEF FNtab(X%,Y%)
 6480 [OPT pass:LDA #31:JSR
&FFEE:LDA #X%:JSR &FFEE:LD
A #Y%:JSR &FFEE:]
 6490 =pass
 6500
 6510 DEF FNsettime(A%)
 6520 [OPT pass
 6530 JMP P%+8
 6540 .osblock EQUW A%:EQUW
0:EQUB 0
 6550 LDA #2:LDX #osblock M
OD256:LDY #osblock DIV256:J
SR &FFF1:]
 6560 =pass
 6570
 6580 DEF FNreadtime
 6590 [OPT pass
 6600 JMP P%+8
 6610 .osblock EQUW 0:EQUW
0:EQUB 0
 6620 LDA #1:LDX #osblock M
OD256:LDY #osblock DIV256:J
SR &FFF1
 6630 LDX osblock:LDY osblo
ck+1
 6640 ]
 6650 =pass
 6660
 6670 DEF FNvdu(B%)
 6680 [OPT pass:LDA #B%:JSR
 &FFEE:]
 6690 =pass
 6700
 6710 DEF FNtimes(C%,D%,E%)
 6720 [OPT pass
 6730 LDA #0:STA E%:STA E%+
1
 6740 LDY #16
 6750 .L%
 6760 ROR D%+1:ROR D%:BCC P
%+15
 6770 CLC:LDA C%:ADC E%:STA
 E%:LDA C%+1:ADC E%+1:STA E
%+1
 6780 ASL C%:ROL C%+1
 6790 DEY:BNE L%
 6800 ]
 6810 =pass
 6820
 6830 DEF FNdivide(C%,D%)
 6840 [OPT pass  \uses &90-
&93
 6850 LDA #0:STA &90:STA &9
1:STA &92:STA &93  \quotien
t+remainder
 6860 LDY #16
 6870 .L%
 6880 ASL &90:ROL &91  \quo
tient <--
 6890 ASL C%:ROL C%+1:ROL &
92:ROL &93  \remainder <--
dividend
 6900 INC &90  \quotient+1
 6910 SEC:LDA &92:SBC D%:ST
A &92:LDA &93:SBC D%+1:STA
&93 \remainder-divisor
 6920 BCS P%+16  \-ve resul
t?
 6930 LDA &92:ADC D%:STA &9
2:LDA &93:ADC D%+1:STA &93
\restore remainder
 6940 DEC &90  \quotient-1
 6950 \
 6960 DEY:BNE L%
 6970 LDY #4
 6980 .L%
 6990 LDA &90:STA C%:LDA &9
1:STA C%+1  \quotient
 7000 LDA &92:STA D%:LDA &9
3:STA D%+1  \remainder
 7010 ]
 7020 =pass
 7030
 7040 DEF FNplus(B%,C%,D%)
 7050 [OPT pass:CLC:LDA B%:
ADC C%:STA D%:LDA B%+1:ADC
C%+1:STA D%+1:]
 7060 =pass
 7070
 7080 DEF FNminus(B%,C%,D%)
 7090 [OPT pass:SEC:LDA B%:
SBC C%:STA D%:LDA B%+1:SBC
C%+1:STA D%+1:]
 7100 =pass
 7110
 7120 DEF FNadval(X%)
 7130 [OPT pass:LDA #128:LD
X #X%:JSR &FFF4:]
 7140 =pass
 7150
 7160 DEF FNstrings(N%,stri
ng$)
 7170 [OPT pass
 7180 LDA #ASC string$:LDY
#N%
 7190 .L%
 7200 JSR &FFEE:DEY:BNE L%
 7210 ]
 7220 =pass
 7230
 7240 DEF FNend
 7250 [OPT pass:RTS:]
 7260 =pass
```

This listing is included in this month's cassette tape offer. See order form on Page 50.

Changing values...

PETE BIBBY continues to explore the technique of passing parameters to procedures

IF you can remember what we did last month, you should recall how we carried on with our exploration of the use of procedures.

Armed with the knowledge of what we dealt with, understanding Program I, which uses a procedure to calculate the area of a rectangle, should cause you no difficulties.

```
   10 REM Program I
   20 PRINT "Length";
   30 INPUT base
   40 PRINT "Breadth";
   50 INPUT height
   60 PROCarea(base,height)
   70 END
   80 DEF PROCarea(length,b
readth)
   90 area=length*breadth
  100 PRINT "The area of a
rectangle of length "; leng
th '"and breadth ";breadth
" is ";area " square units.
"
  110 ENDPROC
```

Program I

Just in case your memory is as bad as mine, let's see what's happening when we run the program.

The first five lines are easy enough. By the time you've replied to the prompts you should have two values tucked away in the numeric variables *base* and *height*. Line 60 then calls PROCarea which uses these values to work out the area of a rectangle of sides *base* and *height*.

As you'll recall, the values are passed to the procedure in the form of parameters in the parameter list – the bit in brackets after the procedure name.

The procedure itself is defined between lines 80 and 110. However, it doesn't make use of the variables *base* and *height* that we've dealt with in the main part of the program.

Instead of these, the parameter list following the DEF PROC of line 80 has two variables named *length* and *breadth*. It uses these throughout the procedure definition to calculate the value of area.

While this looks like it's begging for a "No such variable" message as the Electron desperately searches its memory for values for *length* and *breadth*, this doesn't happen.

Instead the computer is clever enough to compare the two parameter lists of lines 60 and 80 and realise that it is to give *length* the value held in *base* and similarly *breadth* gets the value of *height*.

Once this substitution has been done – the parameters are passed – the procedure carries on and works as it should.

If you want, you can look on the parameters used in the procedure definition as dummy parameters. In themselves, they don't have any value but are just used to show the micro what to do when it actually gets some figures to work with.

In PROCarea, both *length* and *breadth* are dummies. They're given no values of their own in the main program.

However, when a procedure call is made, the parameter list contains the real parameters whose values are to be used in place of these dummy parameters.

In the case of Program I these are *base* and *height*. In effect the dummy parameters – or formal parameters as they are sometimes known – are used to "mark the place" for values that will be supplied when the procedure is used.

These are held by the real or actual parameters that follow the PROC that calls the procedure. So in Program I *base* and *height* are formal parameters. Program II gives us another example of parameter passing:

```
   10 REM Program II
   20 PRINT "Give me a numb
er"
   30 INPUT first
   40 PRINT "Give me anothe
r number"
   50 INPUT second
   60 PROCmaximum(first,sec
ond)
   70 END
   80 DEF PROCmaximum(max,m
in)
   90 temp=max
  100 IF min>max THEN max=m
in:min=temp
  110 PRINT;max" is greater
 than ";min
  120 ENDPROC
```

Program II

Again, the actual procedure used is extremely simple. It just finds which of two numbers is the greater.

You supply the numbers in response to the prompts of lines 20 and 40 and the program stores these values in *first* and *second*. Then line 60 calls PROCmaximum using these values as real or actual parameters.

The procedure itself is defined between lines 80 and 120 using two dummy, or formal, parameters, *max* and *min*. These are used to show the Electron what to do whenever PROCmaximum is called.

So when line 60 invokes the procedure, *max* takes its value from *first* and *min* takes its value from *second*. The formal parameters collect their values from the actual parameters.

Once this has been done, line 90 stores the value of *max* in the temporary variable *temp*. The next line checks to see if, despite the names, *min* is greater than *max*.

If it is the code after the THEN does a swap, resulting in the larger of the two values ending up in *max*.

And if you think that line 100 could be:

```
100 IF min>max THEN max=min
:min=max
```

try it and see the error of your ways. The next line just gives the result of all this.

So Program II works by passing parameters. Incidentally can you see a flaw in it?

Try giving it 2 and 2 in response to the prompts and see what happens. Silly, isn't it? Can you remedy the problem?

One thing about passing parameters that we've just taken for granted is the way that the parameter lists correspond.

Values are passed according to position. This means that when a procedure is called the value of the first actual parameter is given to the first dummy parameter in the procedure definition.

The second actual parameter used in the call passes its value to the second formal one in the definition and so on.

So, in Program I the value in *base* was transferred to *length* and the value in *height* passed to *breadth*.

It's a strict ordering, the Electron matching them up carefully. See what happens if they don't match. Try adding a parameter to either list, or omitting one, and watch the micro's reaction.

In both Program I and Program II this strict correspondence hasn't mattered so much, as even if the user got his parameters mixed up the result would be the same.

This isn't always the case, as Program III shows.

```
   10 REM Program III
   20 PRINT "Give me the pr
incipal"
   30 INPUT principal
   40 PRINT "Give me the in
terest rate"
   50 INPUT interest
   60 PROCcalculate(princip
al,interest)
   70 END
   80 DEF PROCcalculate(amo
unt,rate)
   90 increment=amount*rate
/100
  100 total=amount+incremen
t
  110 PRINT "After one year
 the principal"'"plus inter
est is ";total" pounds"
  120 ENDPROC
```

Program III

Keeping to our tradition of simple programs used to make a point rather than stun the reader with their elegance and power, Program III just calculates the interest on a sum of money.

By the time the micro has worked its way through the listing to line 60 the variables *principal* and *interest* will hold the amount of money invested and the interest rate respectively.

When line 60 calls PROCcalculate, the value in *principal* is passed to *amount* and that in *interest* is transferred to *rate*.

The dummy or formal parameters used in the procedure definition take their values from the real or actual parameters used in the procedure call.

So if you've given *principal* the value of 100 and *interest* 5, you can expect the answer to be 105.

The trouble is that if you've made a mistake and give *principal* the value 5 and *interest* the value 100 the program works but the answer is wrong. We've got our parameters in a twist!

A more likely way this error can occur is if we use a line like:

```
60 PROCcalculate(principal,
interest
```

to call the procedure but use:

```
PROCcalculate(rate,amount)
```

in the procedure definition.

Again the values of the dummy and actual parameters don't match as intended.

The program won't crash but its results will be wrong. So be careful to ensure that the items in your program's parameter lists correspond.

So far all the parameters we've passed have been numeric values. We can however pass strings as parameters, as Program IV shows.

Obeying the prompts results in a number being held in the numeric variable *number* and, for a change, a string being held in *name$*.

Line 60 then calls the aptly named PROCtrivial using these variables as its parameters. The result is that the value of *number* is placed in *value* and the contents of *name$* is copied into *string$*.

```
   10 REM Program IV
   20 PRINT "Give me a numb
er"
   30 INPUT number
   40 PRINT "Give me a name
"
   50 INPUT name$
   60 PROCtrivial(number,na
me$)
   70 END
   80 DEF PROCtrivial(value
,string$)
   90 PRINT "The number was
 ";value" and the name was
"string$
  100 ENDPROC
```

Program IV

Line 90 just prints out the results of all this.

Apart from proving that you can pass strings as parameters, once you've run it Program IV can show you what can go wrong using strings as actual parameters.

As we saw last month we can use the procedure in immediate mode. If you don't believe me, try:

```
number=1
name$="Noreen"
PROCtrivial(number,name$)
```

and see what happens.

However, when you use actual values rather than variables as parameters, you have to be careful. Try:

```
PROCtrivial(1,Fred)
```

and you'll get the:

```
No such variable at line 80
```

message.

This is because the procedure definition expects a string as the second parameter but it only finds what it takes to be a variable. Inverted commas solve the problem as you'll find with:

```
PROCtrivial(1,"Fred")
```

And while we're on the subject of what can go wrong when we pass parameters, try using:

```
PROCtrivial("FRED",1)
```

The result is the message:

```
Arguments
```

showing that you've mixed up the order of the variables.

The procedure expects a number followed by a string whereas you've tried to give it a string followed by a number. So, not only does the order of the variables in the parameter list, so does the type.

And that's where we'll leave passing parameters for this month. Until next time, try using the parameter passing techniques in your own programs.

And if that doesn't keep you busy enough, can you explain what's gone wrong in Program V?

```
   10 REM Program V
   20 temp=0
   30 PROCadd
   40 first=temp
   50 PROCadd
   60 second=temp-first
   70 PROCmaximum(first,sec
ond)
   80 PRINT "and the total
of both is ";temp
   90 DATA 1,2,3,4,5
  100 DATA 6,7,8,9,10
  110 END
  120 DEF PROCadd
  130 FOR loop=1 TO 5
  140 READ number
  150 temp=temp+number
  160 NEXT loop
  170 ENDPROC
  180 DEF PROCmaximum(max,m
in)
  190 temp=max
  200 IF min>max THEN max=m
in:min=temp
  210 PRINT;max" is greater
 than ";min
  220 ENDPROC
```

Program V

This attempts to sum two lists of numbers, say which is the greater and output their total. Yet something has gone badly wrong. Can you see the error?

- *More on this next month.*

Micro Messages

Changing faces on Mini Office

SOME time ago I was lucky enough to have as a gift an old Centronics printer. This coupled to my Electron via a First Byte interface gave me a good machine for listing purposes.

I then progressed to your excellent Mini Office program. I subsequently read Dave Bertenshaw's review of the DMP 2000 printer in the August 1986 issue of Electron User *and I purchased one.*

However, I find I cannot vary the type face from within the Mini Office program except by using the very inconvenient and discouraged practice of altering the DIP switches.

As I am very anxious indeed to obtain the very best quality from both program and printer, I would appreciate some guidance as to how I may insert my control codes via the software. I would prefer to write with NLQ rather than my printer's default style. – **J.Churchman, Hove, Sussex.**

● Unfortunately you can't send control codes to the printer from within the original Mini Office word processor.

However, you can set up the printer from Basic before you load the software.

If it is essential to change type styles within a document you must use a word processor like Acornsoft's View or Slogger's Starword.

Which word processor?

HAVING bought an Electron for my son a couple of years of ago and later adding the Plus 1, I left the computer to him and his games.

I think I gave up when I realised that the Plus 1 presented new problems. I would now like to use the computer as a word processor. I find the adverts about rom boxes and so on interesting but beyond my experience and knowledge.

Could you suggest a package which would provide me with trouble-free word processing at least on a par with the BBC Micro's Edword and advise me what else I need? – **Lawrence Hughes, Summerhill, Wrexham.**

● There are several word processors on the market, including Mini Office, View and Starword. If you don't mind entering listings, there was a simple text editor in the August 1986 issue of *Electron User*.

The only piece of equipment you will need is a printer. There are many to choose from so shop around for the best quality and value for money.

Suggestion for Surgery

I AM a proud owner of an Electron and I think Electron User *is the best magazine available. My favourite parts are Software Surgery, News and Micro Messages.*

I would like to make a suggestion concerning Software Surgery. The reviews so far have been very helpful but have lacked one thing which I think is important.

Surely I am not the only one who thinks it would be helpful if you could say which joysticks are compatible with each game whenever possible. It would be much appreciated and there would be no disappointment after buying a game which doesn't work with your joystick. I have a Plus 1 with Voltmace Delta 3B Twin. – **Headley Thompson, Erdington, Birmingham.**

● The two most common joystick interfaces are the Plus 1 and First Byte. All recent releases, if they have a joystick option, should work with the Plus 1. Some games like Frak! also include a First Byte joystick option as well.

We'll bear your comments in mind and mention whenever possible the joystick option.

Typing tips for programs

BECAUSE so many people have written in mistakenly claiming that the programs from the pages of Electron User *do not work, I have written some tips for entering listings.*

Look over the program to see if there are any obvious mistakes or blurs.

So that you don't read part of a wrong line by accident, I suggest that a small piece of paper is placed under the line you are about to type in.

After about ten lines read through your program. This makes checking easier.

I have written these tips because apart from machine code programs all the ones I have typed in have worked. – **David Hinsley, Haverfordwest, Dyfed, Wales.**

● It can be more difficult to spot typing errors in machine code programs, but we assure you, they all work.

Thanks for the support

HAVING bought Electron User *for over two years now, I must congratulate you on your excellent magazine. Your mail-order service is also first class (excuse the pun).*

One other commendation is that the price has not gone up since February 1984! How many other computer magazines could claim that, or any magazine for that matter?

I also used to buy another magazine which claimed to support the Electron, but its bias was clearly towards the BBC B and Master.

My most enjoyable type of program is the adventure, but alas I have not been able to complete one. Merlin's Cave provides me with loads of ideas and makes me envious of our readers who can actually solve these great mysteries!

I am appalled at the High Street retailer's lack of support for the Electron, both in hardware and software. The shelves are empty in comparison with other machines.

I hope this situation is remedied in the near future. – **Michael Calpin, Rusholme, Manchester.**

Software for toddlers

A PICTORIAL Odd Man Out program based on transport or animal themes would be a lovely idea for the under fives. For instance you could have three pictures and the child presses 1,2 or 3 for the odd man out.

Another idea would be a program putting people on and off a bus on the lines of Acornsoft's Hook/Crane program but limited to five passengers. I have just bought an Electron for our Nursery Unit and software seems very limited at present for 3-5 year olds. – **D.L.Sneath, Kettering, Northamptonshire.**

● Educational software for the Electron does appear to be limited but only because it can

→

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be difficult to find, not because there isn't much available.

You'll find a pullout guide to educational software in the September 1985 issue of *Electron User*. This lists around 80 titles and their suppliers – and in the year since this was published many more titles have been released.

Our own Fun School tape, advertised on Page 61 of this issue is suitable for young children and you'll find many good program listings in *Electron User*. Marching Order in the March 1986 issue is particularly good.

***WHAT would you like to see in future issues of* Electron User?**

What tips have you picked up that could help other readers?

Here is your opportunity to share your experiences.

Remember that these are the pages that you write yourselves. So tear yourself away from your Electron keyboard and drop us a line.

The address is:
Micro Messages
Electron User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.

On a sticky wicket

I THINK your magazine is great reading and I think it is well worth £1. One of my favourite parts is Micro Messages. I dont think Electron User *could be improved, except by publishing it fortnightly.*

Anyway to my problem: I saw Tynesoft's Ian Botham's Test Cricket being advertised in their booklet which came with Electron User *a month or two back. Immediately I sent off for it.*

Having played it a few times, I can field quite well, but does anyone know how to bat? I have done what the instructions say but I always get all my men out without even hitting the ball. Please will someone give me a helping hand? – **Andrew Warriner, St Albans, Herts.**

● It's over to the readers again. Can anyone help Andrew sort out his batting problem?

Compatible cassette

I HAVE owned an Electron for two and a half years. During this time I have used a Triumph CR1610 cassette recorder, which is supposed to be computer compatible.

To a certain extent it is, but when I bought a game made by Alligata Software, I just could not get it to load at any volume level.

The game itself was not at fault, as it loaded perfectly on my friend's Electron using a different type of cassette recorder.

This occurred a few more times, so I am now loath to try any makes other than the ones I know load, and with the ever-expanding range of software this can be very frustrating.

Please could you recommend a cassette recorder that is totally compatible with the Electron, and that is cheap and widely available? – **Fraser Johnson, Spalding, Lincs.**

● We use quite a variety of tape recorders and most are fairly reliable. As long as it is fairly new and in good condition it should be fine.

Have any of our readers come across a particularly good tape recorder?

Once saved, no recall

PERHAPS it is too much to ask of Mr Goodacre's already excellent Draw Writer program, but is there any way of recalling to that program, at some later date, an unfinished *SPOOLed drawing for completion? – **N. Gill, Camberley, Surrey.**

● Unfortunately you can't save a screen, reload it at a later date and continue working on it. Once saved it cannot be edited further.

Advising on devices

I THINK that Mr Johnston (Micro Messages, August 1986) might find the following tips useful for using his Electron to control electrical devices.

The Centronics printer port on the back of the Plus 1 can be used as a user port for output and can directly control eight relays for whatever purpose he wishes (or as many as 256 with the correct logic circuits). Its address is &FC71.

The cable connections are listed in the Plus 1 user guide, and simply connecting a low power consumption relay to each of the eight data lines will give him the control he requires.

By poking the correct value into the address, such as ?&FC71=255, any of the relays may be activated.

Devices can be independently controlled by ANDing or ORing masks with the value already in the location. (The article on masked bytes in the April 1986 issue of Electron User *explains how to do this).*

It is not, however, possible to perform operations on the contents of the address directly, since the value read from the port is unlikely to be the same value you sent there.

Instead perform all the

Plus 3 protection

IN the September issue of Electron User *you published a letter from Jason Shaw inquiring about preventing Plus 3 discs from being catalogued.*

The method Jason suggests for the BBC Micro works because Acorn's DFS uses the first 8 bytes of track zero, sector zero on a disc to store the disc title – &15 is the hexadecimal equivalent of decimal 21, which some readers will recognise as the VDU code for disabling screen output.

When you catalog a disc the first thing the DFS prints on the screen is the disc title. So if you put &15 in the right place the screen is disabled and the rest of the catalog does not appear.

The reason that this method does not work on the Plus 3 is because the ADFS automatically re-enables the VDU drivers after printing the disc title. All you will hide is what you call the disc.

Jason should not be too upset about this because this is a poor way to protect your disc anyway. Anyone who knows what is going on can beat the system by simply changing the title.

A much better way of going about the problem is not to hide the whole catalog, which is a dead giveaway, but to hide individual files.

If you study pages 87-89 of the Plus 3 User Guide you will find a description of the osword &72 call which enables you to read or write blocks of memory directly from or to the disc surface.

If you write a file directly on to the disc like this then it will not appear in any catalog.

This can be loaded back from within a program using an osword call. The ADFS is totally unaware of the existence of the file and none of the ADFS commands will work on it.

A final word of warning – when experimenting with osword &72 use a blank disc or at least backup the disc you use because if you do something wrong then you could overwrite sections of files or even catalog information.

Neil Hoggarth, Liverpool.

● There is a full description of osword &72 calls to access Plus 3 discs in the February 1986 issue of *Electron User*.

necessary operations on a variable and then poke the value of this variable into the memory location.

I use this method quite successfully to control lights, hi-fi, even my coffee maker just by pointing a flashlight at a photo-diode connected to the analogue input of my Plus 1.

May I take the opportunity to congratulate you on a fine magazine. – **Stuart Coggin, Cardiff.**

Light pen problem

I HAVE a small problem with my Electron and I am hoping someone could help me solve it.

I made a light pen from your sister magazine The Micro User. *This works fine on my father's BBC Micro and I have written and converted a great deal of software incorporating the light pen.*

I recently bought an Electron Plus 1, and was disappointed to find I could not get the light pen to work. I was then told that the design of the ULA did not allow for a lightpen register.

Is this true? If so is there an alternative way of using a light pen on the Electron? – **A. Wheeler, Hinckley, Leics.**

● Unfortunately you can't use a light pen with the Electron. The hardware isn't designed to take one and we can't see a way round the problem.

Intermittent malfunction

I'D BE grateful if you could advise me on a problem with my Electron.

It has recently taken to running Acornsoft's Arcadians satisfactorily for a few games and then the laser slides off to one side and sulks.

Again, in the Mazesolver program on the introductory tape, after running early mazes quite happily it claims an error at line 890. When line 890 was listed it was just as in the manual. I re-typed it just in case – no difference.

Subsequently the program has run without any problem at all. I suspect asking what is likely to be the problem is like asking you to read tea leaves.

An intermittent malfunction like this leaves me puzzled. Especially as the machine normally seems to run programs satisfactorily, and to calculate without making huge errors. The agent I contacted thought it was the program. Have you any other suggestion? – **Alan Whitlock, Portsmouth, Hants.**

● We're not sure what is wrong. Have any other readers experienced similar problems with their programs?

Upgrade Reviews

PLEASE could you tell me whether your magazine has reviewed the Acorn Plus 1 and 3 as I am thinking of upgrading my Electron with one or both pieces of equipment?

If you have reviewed them please tell me the issues so that I can order them. – **R.J.Day, Reading, Berks.**

● The Plus 1 was reviewed in the September 1984 issue and the Plus 3 in the March 1985 issue of *Electron User.*

You can still obtain these products by mail order, using the form on Page 53.

View Printer Driver

I HAVE been using Acornsoft's View for quite some time.

The only problem I have found is that I can't find Acornsoft's Printer Driver program in the shops. I don't even know if they make one for the Electron.

The closest I came to finding one was when my local computer shop found an old BBC Micro version. Will this work on the Electron? If not where can I get one? Thank you for a spectacular magazine but please let's have more reviews and reports on cheap and new add-ons for the Electron.

I have just installed the Slogger Turbo upgrade and I come to the same conclusions as you. Well done Slogger and Andyk. – **S. Thompson, Luton, Bedfordshire.**

● Several of our readers have used Acornsoft's View Printer Driver for the BBC Micro and it appears to work perfectly on the Electron. As an alternative you'll find an excellent printer driver generator in the August 1986 issue of *Electron User.*

Troubles with Trogg

I HAVE recently purchased a Plus 1 for the Electron with Shado joysticks. When I run Frak! on the computer Trogg's left and right actions are reversed. Please can you help? – **Mark Pearson, Rochester, Kent.**

● You'll have to take your joystick apart and swap the wires on the left switch with those on the right switch.

Muddled about modes

I READ the advertisement for the the Elk Turbo Driver from Slogger and was interested by it, especially the part about it being able to run BBC Micro software.

There is only one problem – how am I supposed to know whether the software I buy is in Mode 7? I may have misunderstood the statement and would appreciate your help. – **M. Richardson, Stonehouse, Glos.**

● The Elk Turbo Driver simply speeds up the Electron and does not enable software to run which did not run previously.

A lot of BBC Micro software uses Mode 7 for titles and instructions but will run quite happily on the Electron, albeit in black and white Mode 6.

We wouldn't recommend buying BBC Micro software but by all means borrow games from friends and try them out.

You'll find a full review of the Turbo Driver in the July 1986 issue of *Electron User.*

Desk Diary on disc?

MY main use for my Electron is organisational application, records and word processing on a smallish scale.

Adding a Plus 3 to my equipment has extended the usefulness of View, Viewsheet and Database with fast storage and retrieval.

Unfortunately the excellent Acornsoft Desk Diary and Planner on cassette now seems unbearably slow in loading and saving.

Phone calls to Acorn and official stockists indicate that there are no plans to issue Desk Diary and Planner on 3.5in disc for the Plus 3 now or in the future.

Perhaps your influence in the Electron market by reviewing its merits may persuade Acorn, or some enterprising competitor, to re-think the situation regarding Desk Diary on disc, and I would be first in the queue! – **Jack Frizzell, Birmingham.**

● If readers want software on disc then get in touch with the software companies and let them know your views.

If demand is great enough then we'll start to see some disc-based software.

ALL programs printed in this issue are exact reproduction of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

All the programs from the last 12 months of Electron User are available on tape.

On the November 1986 tape:
TRAIN TROUBLE You've just robbed a bank. Can you escape the forces of law and order in this chase over the carriages of a fast moving express? **DAY AT THE RACES** You can gamble away to your heart's content in safety with our entertaining two player horse racing game. **BASIC COMPILER** This superb utility will turn your Basic programs to machine code in no time at all. **10 LINERS** A routine from our fascinating series of short programs.

On the October 1986 tape:
RAT CATCHER Try your hand at pest control with this fast action arcade game. **MATHS RUN** Put your powers of mental arithmetic to the test with this educational program. **BOS** This on screen editor will take the tedium out of debugging listings and sort out your typing slips. **CROSSWORD** Two programs for crossword lovers – one to design crosswords and the other to help you solve them. + ***BONUS game;*** **QUASIMODO'S QUEST** Rescue Esmerelda in this colourful version of the all time favourite.

On the September 1986 tape:
CAVERN CAPERS Blast your way from the depths of the labyrinth to escape from the planet. **DRAW WRITER** A superb utility to translate your on screen graphics to the procedures to create them. **COMPANY COUNT** Work your way up the company pecking order in this educational maths test. **TEN LINERS** Another short but fascinating program. + ***BONUS game;*** **ROCKFALL** Go diamond mining in this intriguing multi-screen arcade romp.

On the August 1986 tape:
HOWZAT! A vivid recreation of a day's test cricket for two players. **3D MAZE** Quick reactions and a sense of direction are needed to escape from our twisty maze. **TEXTED** Let this versatile text editor turn your micro into an electronic typewriter. **DRIVER** A powerful printer driver for View.

On the July 1986 tape:
ROYAL WEDDING Celebrate the royal event with our ingenious sliding block puzzle. **SNAPDRAGON** Two player version of the classic card game. **ATTRIBUTES** Colourful two player strategy game. **FORMATTER** Make your listings easier to read. **DISCS** Extended star commands. **EXTRA COMMANDS** A WHILE ... WEND command for your micro. **PLUS** superb digitised picture of Andrew and Sarah.

On the June 1986 tape:
FISHING Enjoy a quite day by the river, and maybe catch your tea as well! **TACTICAL PURSUIT** A two player strategy game played with pawns on a chess board. **MINIBASE** Create an electronic telephone directory. **EXTRA COMMANDS** Add more commands to Basic. **SCREEN DUMP** Multi-tone screens dumps for Epson compatible printers.

On the May 1986 tape:
MISSILE JAMMER Defend the city of Pezina from a missile invasion. **VECTOR LETTERS** Use *LINE to create double height text. **DEGREES** Convert from Centigrade to Fahrenheit and vice-versa. **CROCODILE TEARS** Spell well or end up as a crocodile's dinner. **ZAP** Blast the marauding aliens. **EXTRA COMMANDS** Adding new keywords to Basic.

On the April 1986 tape:
INVASION FORCE Exciting zap 'em space game. **EASTER EGG HUNT** Seasonal game using compass points. **BACH TO BASICS** Music tutor. **NOTICE BOARD** Text scrolling utility. **SEARCH and RECOVER** Two routines from the disc article. **NOTEBOOK** Recursion backwards.

On the March 1986 tape:
GRAND PRIX Exciting race game. **DICER** A clever test of strategy. **MARCHING ORDER** Counting and ordering numbers. **FIND AND REPLACE** Useful editing program. **SECTOR EDITOR** Excellent disc utility. **TIMEPIECE** Superb graphics demonstration. **OXO** Game of cunning. **TRICIRC** A circle of triangles.

On the February 1986 tape:
NECROMANCER Superb text adventure. **GREBIT** Arcade action. **FAST BACKUP** Disc utility. **MACHINE CODE** How to write an arcade game. **TAPEDISC** More software transferring techniques. **SIDEWAYS RAM** Example program.

On the January 1986 tape:
FRUIT WORM An arcade classic. **HELICOPTER RESCUE** Pilot an air sea rescue helicopter. **MACHINE CODE** Detect collisions between sprites. **TAPEDISC** Transfer your software to disc. **MODE012** Multi-Mode screens.

On the December 1985 tape:
GET SET SANTA Christmas fun collecting presents. **MISSILE ATTACK** Save your cities! **PROGRAM PROBE** Using joysticks. **SPACE COUNT** Counting for youngsters. **CHRISTMAS CARD** Cards and carols for all. **DISC MENU** Disc Menu creator.

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DUNGEON QUEST An amazing all action arcade adventure. **PILOT** Computer assisted learning language. **RAVING ROLLER** Arcade action in the garden. **TRAIN** Animated action. **KALEIDOSCOPE** Colourful graphics action.

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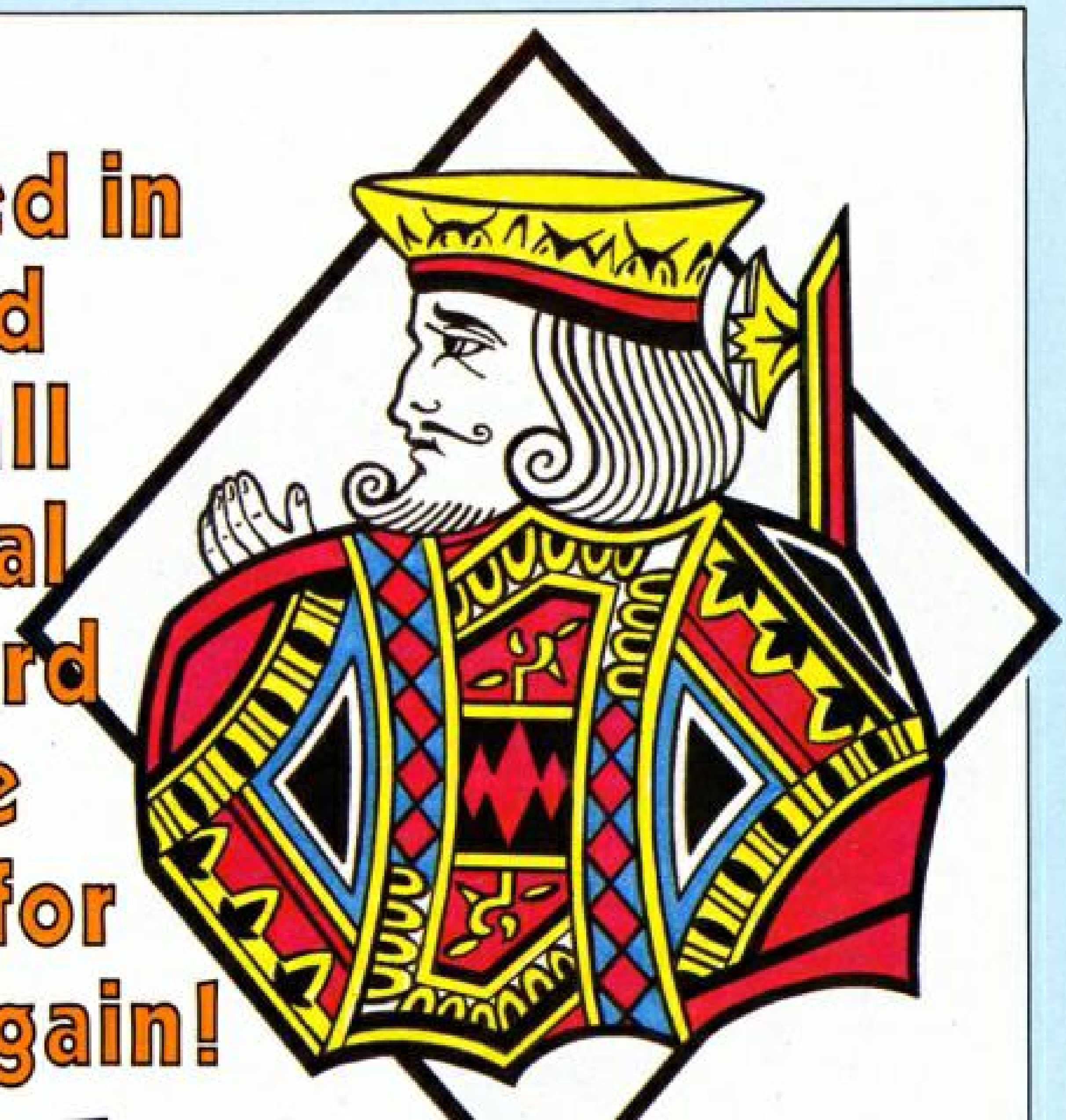

9 Classic card & board games

No. 1

- Draughts
- Fives
- Dominoes
- Molecule
- Reversi
- Code Breaker
- Patience
- Pontoon
- Pairs

For the BBC Micro and Electron

9 Classic card & board games

No. 2

- Backgammon
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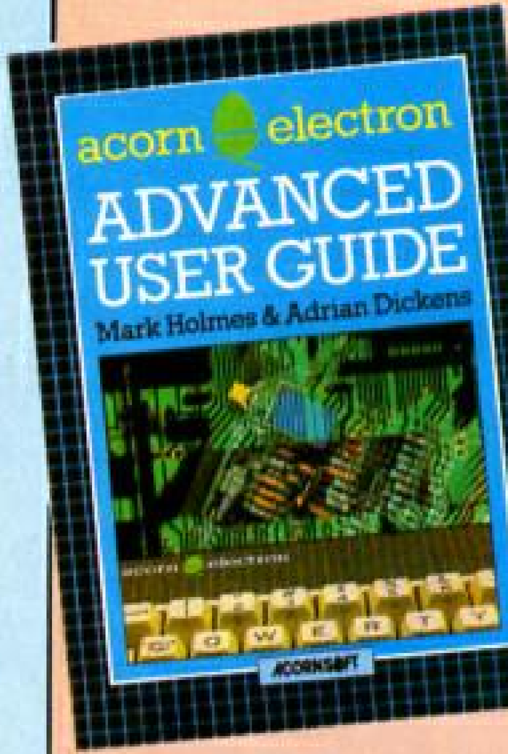

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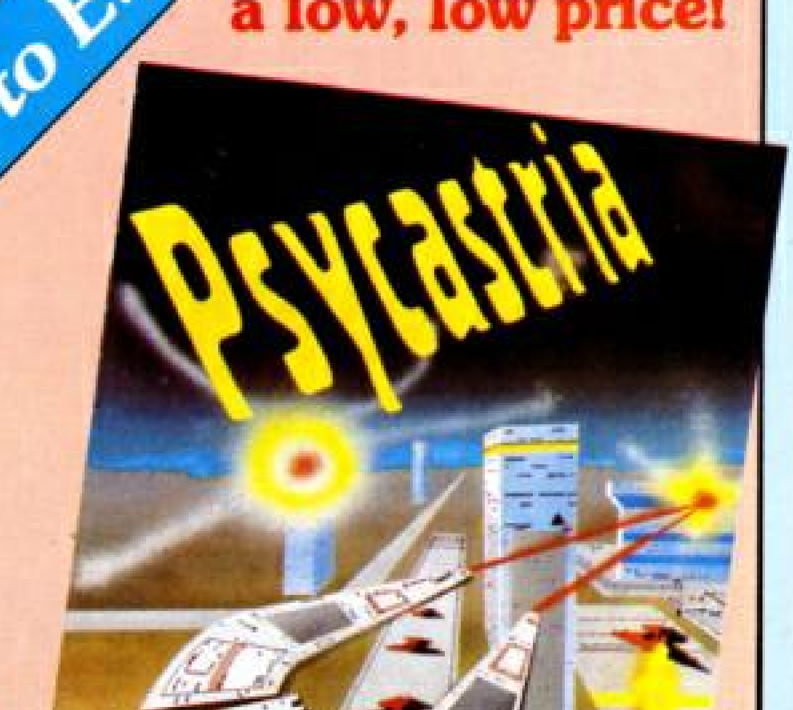

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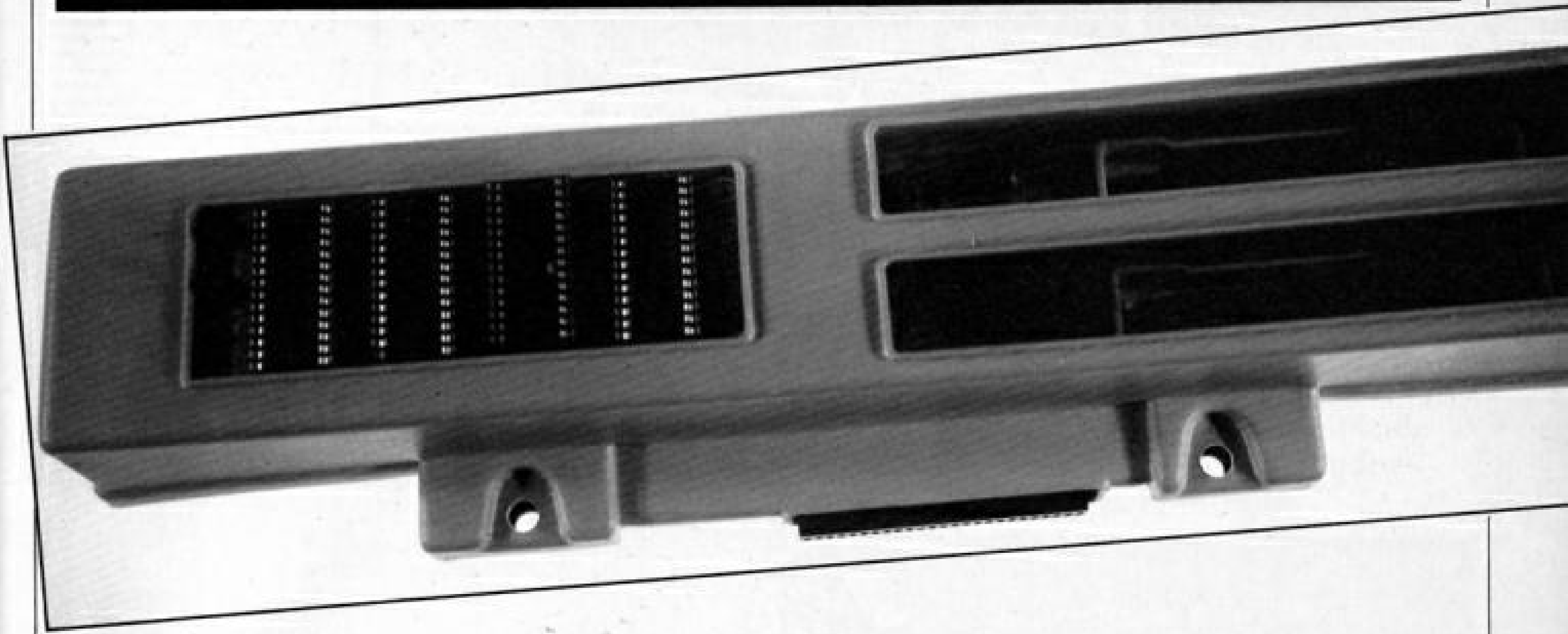


Plug-in power: An alternative to the Plus I

By ROLAND WADDILOVE

ALTHOUGH the Electron is capable of managing up to 16 paged roms, Acorn hasn't included any sockets to plug them in and it has been left to third parties to supply the necessary add-ons to take advantage of them.

One of the first companies to produce one was Slogger with the Rombox. This has been around for quite a while now and you'll find a full review in the August 1985 issue of *Electron User*.

Now the Rombox has been upgraded to include many of the features found in the Plus 1 along with the old Rombox's ability to handle roms.

It can be considered an alternative to the official Acorn product.

The new Rombox Plus features four rom sockets, two rom cartridge sockets, a printer port and an operating system – on rom – equivalent to the Plus 1's, to control these extra functions.

The unit is similar in size to the Plus 1 but not quite as deep, and like the Plus 1 it can be plugged into the back of the Electron or Plus 3.

Both 8k and 16k roms can be used in the four rom sockets and they can be configured as numbers 4-7 or 12-15 by altering the position of two "jumpers" at the extreme left of the box. The two cartridge sockets are fixed as 0-3 and each cartridge may contain one or two roms.

Since there are only four rom sockets it's possible to have more roms than sockets and this is where sideways ram comes in handy.

Slogger's sideways ram card may be used in any or all of the four rom sockets providing up to a maximum 64k of ram.

Although 64k of sideways ram is possible, it would be rather expensive.

In addition the third rom socket can be configured to accept a single 8k ram chip.

Rom images can be saved to tape or disc and then loaded into the ram as and when they are needed. It saves wear and tear on the roms and sockets.

A utility rom like Slogger's Elkman is useful here since it has several commands specifically designed for loading and saving rom images.

The Rombox's operating system is able to take advantage of any sideways ram present to expand the printer buffer from 63 to up to almost 16000 bytes. It is quite intelligent by the way and can tell if you are already using the ram for storing a rom image and won't attempt to use it if you are.

The advantage of a large printer buffer is that the Electron can dump all its text in the buffer in one go. The printer will then chug away printing the text in the buffer in its own sweet time while the Electron can get on with something else.

The two cartridge sockets will take standard rom cartridges such as Acornsoft's View and Viewsheet and ACP's rom adapters.

The sockets are intended to be identical to the Plus 1's but I found slight differences.

The sockets in my Rombox Plus were too small to take my Cumana disc interface and ACP's Plus 4 would not work.

The unit works perfectly with the Plus 3 but if you're thinking of upgrading to a Plus 4 or Cumana disc system check with Slogger first as you may experience problems. I did with mine yet others didn't with theirs – it's a bit of a mystery.

In addition to all this, there's a Centronics parallel interface at the rear of the unit for a printer.

Most printers can be used with the Rombox Plus provided they have a Centronics interface and you have a suitable lead.

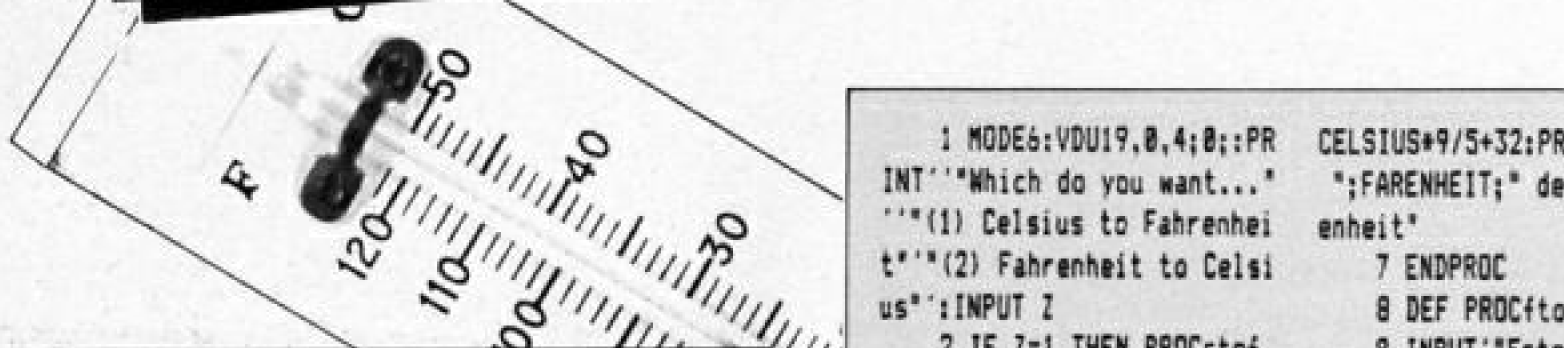
The Rombox Plus has all the features of the Plus 1 except for a joystick port but also provides four rom/ram sockets. It is well worth considering as an alternative to the Plus 1. ■

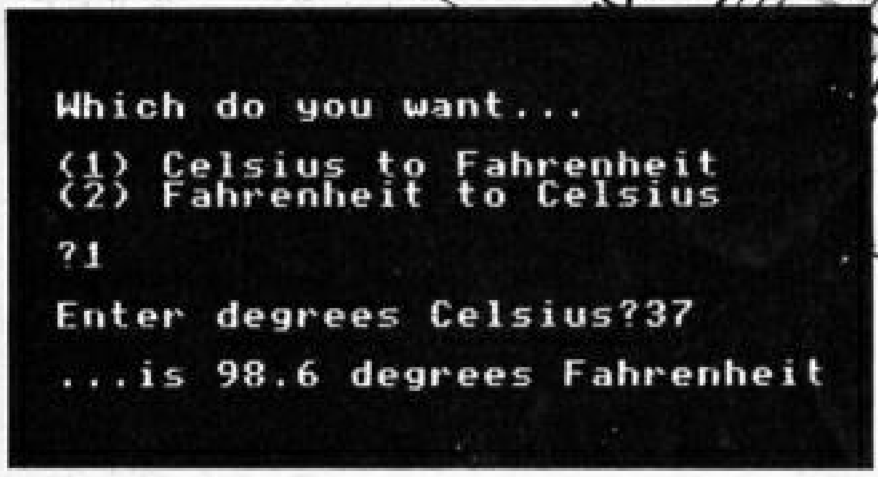
Product: Rombox Plus
Price: £49.95
Supplier: Slogger, 107 Richmond Road, Gillingham, Kent ME7 1BR. Tel: 0634 52303

The heat is on...

10 LINER

OLD habits die hard, so if you're like Bruce Horgan and can't fathom out what the weather men are talking about these days then his utility is for you. It converts degrees Celsius to good old fashioned degrees Fahrenheit and vice-versa.





```
Which do you want...

(1) Celsius to Fahrenheit
(2) Fahrenheit to Celsius

?1

Enter degrees Celsius?37

...is 98.6 degrees Fahrenheit
```

```
    1 MODE6:VDU19,0,4;0;:PR
INT''"Which do you want..."
''"(1) Celsius to Fahrenhei
t"'"(2) Fahrenheit to Celsi
us"':INPUT Z
    2 IF Z=1 THEN PROCctof
    3 IF Z=2 THEN PROCftoc
    4 END
    5 DEF PROCctof
    6 INPUT'"Enter degrees
Celsius",CELSIUS:FARENHEIT=
CELSIUS*9/5+32:PRINT'"...is
 ";FARENHEIT;" degrees Fahr
enheit"
    7 ENDPROC
    8 DEF PROCftoc
    9 INPUT'"Enter degrees
Fahrenheit",FARENHEIT:CELSI
US=(FARENHEIT-32)*5/9:PRINT
'"...is ";CELSIUS;" degrees
 Celsius"
   10 ENDPROC
```

Farewell Merlin, greetings Pendragon

TIME has flown, 18 months in fact, since I started helping adventurers through these pages and I now have to return to the fountain of youth for a spot of rejuvenation.

One of the young sprogs who has been apprenticed to me has shown a lot of promise and so from now on he, Pendragon, will be running this column. He has some really superb ideas to help you in your adventuring, and I wish him every success.

The last two years have seen a massive resurgence in interest in the Electron and this has also been true of adventures.

The appearance of the Epic games heralded a new era.

Later adventures, notably from Robico and Magus, have shown that no longer do we stand in the shadow of the BBC Micro.

Many readers have asked me what my favourite adventures are, and for the first time I have listed the 10 I like the most. Remember, it's purely a personal opinion.

Another question that also arises regularly is what is my real name. For those of you who haven't become friends through correspondence with this column, I am Paul Gardener.

I have had a great deal of fun writing this column and have made many friends. Thank you all for your support – which I hope will continue when Pendragon takes over.

Merlin's favourite adventures

1:	Wheel of Fortune	Epic
2:	Rick Hanson	Robico
3:	What's Eeyore's	Magus
4:	Locks of Luck	Magus
5:	Quest for the Holy Grail	Epic
6:	Woodbury End	Shards
7:	Rick Hanson II	Robico
8:	Kingdom of Klein	Epic
9:	Castle Frankenstein	Epic
10:	Myorem	Robico

HALL OF FAME

Robin of Sherwood (continued) *Martin Hanson*

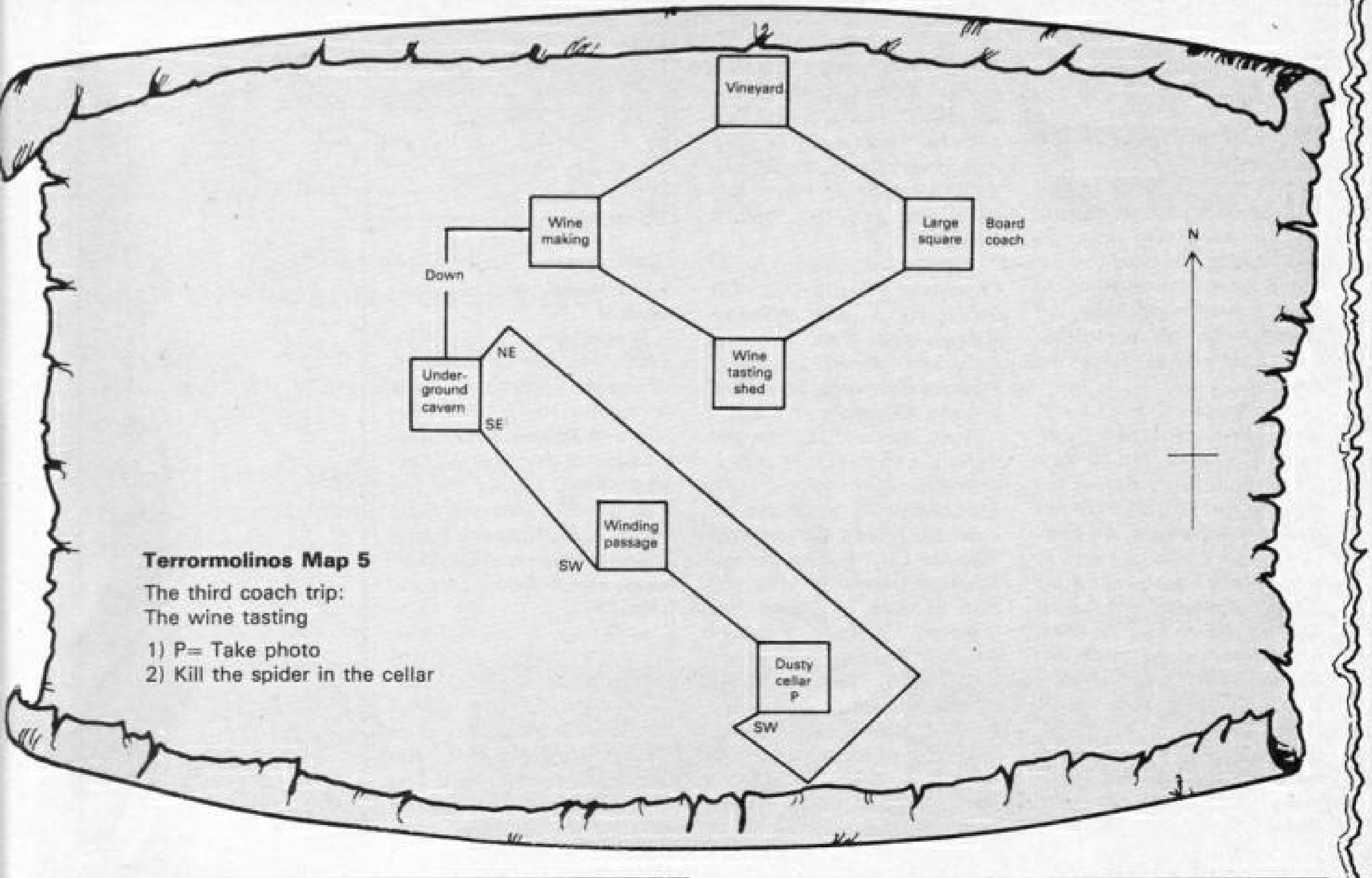
Time to do a bit of bargaining! Go to the templar's camp and DROP CREST. You mustn't return to this location or you will be attacked. Now go to Belleme's castle and CLIMB STATUE. If you now examine the head you will get a very subtle clue. Now EXAMINE EYES.

Go to Gregory's route and WAIT for a couple of turns. Examine his cart and you will see some sacks. Examine them and you will have enough gold to be able to do a swap with the nun. Go to Kirkless Abbey and knock on the door and then drop all your coins.

By now you should have stored five of the touchstones. To store the last one and complete the game go to Rhiannon's circle and drop the silver arrow.

Sphinx Adventure (continued) *M. Alexander*

E - S - D - N - E - CROSS BRIDGE - E - U - DIAXOS - U - TAKE GOLD - TAKE PLATINUM - D - D - S - S - CROSS BRIDGE - E - U - S - TAKE SPICES - N - E - S - KILL DRAGON - YES - TAKE TEETH - D - W - TAKE DIAMOND - E - U - N - W - D - N - E - N - OPEN CLAM - TAKE PEARLS - D - CROSS BRIDGE - TAKE RUG - TAKE COINS - TAKE OPALS - TAKE SILVER - TAKE BOTTLE - W - DROP JACK - W - THROW TEETH - W - OPEN CHEST - DROP KEYS - TAKE SCEPTER - TAKE RUBIES - N - E - N - S - E - W - E - S - N - S - E - W - E - S - N - S - E - W - E - S - N - DROP RUG - DROP GOLD - DROP SILVER - DROP BOTTLE - DROP SPICES - DROP OPALS - DROP PLATINUM - DROP COINS - DROP RUBIES - DROP PEARLS - DROP DIAMOND - DROP SAPPHIRES - DROP SCEPTER - RUB RING - E - S - D - N - E - CROSS BRIDGE - E - S - S -CROSS BRIDGE - E - N - E - N - D - CROSS BRIDGE - TAKE EMERALD - TAKE BOOKS - TAKE CARROT- TAKE CUSHION - W - W - D - N - W - TAKE STILTON - W - S - E - S - D - N - U - TAKE BRACELET - E - S - U - N - W - U - E - E - E - S - CROSS BRIDGE - U - S - W - S - W - W - S - S - S - N



Terrormolinos Map 5

The third coach trip:
The wine tasting

1) P= Take photo
2) Kill the spider in the cellar

- E - W - S - D - D - U - W - U - OPEN CASKET - KILL VAMPIRE - NO - STAKE - N - W - N - TAKE AMETHYST - D - S - D - D - FEED MOUSE - U - W - W - D - E - TAKE BOAT - RUB RING - E - S - D - N - E - CROSS BRIDGE - E - S - S - CROSS BRIDGE - E - N - E - N - D - CROSS BRIDGE - U - N - E - DROP MOUSE - N - U - E - N - TAKE MATCHES - RUB RING - E - S - D - W - CROSS LAKE - LIGHT MATCHES - D - DIAXOS - TAKE CROWN - RUB RING - E - S - D - N - E - CROSS BRIDGE - E - S - S - CROSS BRIDGE - E - N - E - N - D - CROSS BRIDGE - W - W - W - N - E - N - S - E - W - E - S - N - S - E - W - E - S - N - S - E - W - E - S - N - DROP EMERALD - DROP CUSHION - DROP BRACELET - DROP BOOKS - DROP CROWN - DROP AMETHYST - DROP CARROT - DROP RING - DROP LAMP - KNEEL - WAVE WAND.

Countdown to Doom (continued) *Craig Romans*

Now you must drop the discs in the order in which they appeared in the niches. If you have done it right, GET CONDUCTOR and then go down. Go through the exits in the order of the shapes, that is, in the same order as you dropped the discs. Now go NE and you are outside again.

Catch the blob to go back in time and get the navigator box, spacesuit, spices and lastly the crystals. JUMP in the desert. Wear the goggles to cross the swamp and get to the island. From the landing area go W - NW - NW - NW - GET GOGGLES - E - N - E. Throw the can to neutralise the alkali in the pit south of the city. You cannot enter the surface sewer.

Wear the spacesuit to enter the swamp. Go in any direction and then go N - N - GET LIFE SUPPORT - S - N - SE. If you get the medikit you will be cured of radiation sickness. Go up in to the machine room. Depending on the number of beeps the machine emits choose one of the following directions: 12=north, 9=west, 6=south and 3=east. Then U - SW - D - W - N. YOU CAD doesn't mean a thing as you should not kill the rat. PRESS BUTTON to start your ship and finish the game.

PROBLEM CORNER

Castle of Riddles has prompted Ben Wilson, Mark Noble and Dean Duncombe to write in for help. To get down from the pinnacle you must hangglide or drop the cushion before re-entering the castle.

As I remember there are two high points to get down from, and this last answer will enable you to get down from both. To get out of the black maze wave the rod and a coloured smoke will appear. The colours change in different locations, and you must make a map based on the colours.

When you have your map use the colours of the rainbow as a route to the giant's shooting gallery. This route has been published before so, as a last resort, look at the February 1986 issue of Electron User.

To save yourself from drowning you must first take the bucket. If at first you don't succeed . . .

Then bail out the boat. I thought the cushion was in the boat, but I must be wrong. Does anyone know where the cushion is?

Dean Duncombe is also having problems with **Philosopher's Quest.** There isn't a way of recharging the lamp, but it has enough power in it for you to finish the adventure.

One way of conserving its energy is to turn it off when it's not needed.

Chris Lowe writes to say that there seems to be a bug in **Kingdom of Klein.**

When you have the miniature witch's hat and type PUT ON HAT, the hat appears on the voodoo doll even if you aren't carrying it.

Is this a bug or some subtlety on Epic's part?

Peter Armstrong has written in with help for Luke Robertson's problems with **Silver Mountain.** To get past the hound, give it a bone. The path between the row of casks and the shady hollow can only be descended.

The only way out of the goblin's graveyard is by retracing your steps and giving the pony another apple. Does anyone else know differently? Peter is stuck himself in this program and would like to know how to get the poison to Ogban.

From Page 59

LORDS OF ADVENTURE

These readers have written in offering their services to frustrated adventurers. Write to them if you need help, but please remember to enclose a stamped addressed envelope.

Les Shipton, 3 Chesnut Close, Wymington, near Rushden, Northants, NN10 9LX offers help with ***Arrow of death Pt1/2, Castle of Riddles, Classic Adventure, Crown Jewels, Dracula Island, Eye of Zoltan, Escape from Pulsar 7, The Ferryman Awaits, Five Stones of Anadon, Greedy Dwarf, Galadriel in Distress, The Incredible Hulk, Kingdom of Klein, Mystery Fun House, Perseus and Andromeda, Pettigrew's Diary, Ring of Time, Revenge of Zor, Sphinx Adventure, Sadim Castle, Super Agent Flint, Time Machine, The Count, Ten Little Indians, Twin Kingdom Valley, Woodbury End, Wheel of Fortune, Java Star*** and ***The Wizard Akyrz.***

Chris Lowe, 7 Shirley Road, Chadderton, Derby, DE2 4LB offers help with ***Sphinx Adventure, The Wizard Akyrz, Adventureland, Pirate Adventure, Stranded*** and the ***Kingdom of Klein.***

Tony Haynes, 78 Rowden Drive, Lyndhurst Estate, Erdington, Birmingham, B23 5UH offers help with ***Adventureland, Pirate Adventure, Voodoo Castle, The Count, Strange Odyssey, Mystery Fun House, Pyramid of Doom, Ghost Town, Golden Baton, Arrow of Death Pt 1, Time Machine, Circus, Quest for the Holy Grail, Castle Frankenstein, Kingdom of Klein, Wheel of Fortune, Ring of Time, Super Agent Flint, Galadriel in Distress, Staff of Law, Sphinx Adventure, Stranded*** and ***Crown Jewels.***

Martyn Amos, 1 East Town House, Heddon on the Wall, Newcastle upon Tyne, Northumberland, NE15 0DR offers help with ***Sphinx Adventure, Classic Adventure, Terrormolinos, Quest for the Holy Grail, Escape from Pulsar 7, Pettigrew's Diary, Secret Mission, Adventureland, Pirate Adventure*** and ***Gremlins.***

A. Mayze, 2 Lambs Close, Dunstable, Bedfordshire, LU5 4QA offers help with ***Circus***

Tariq Kard, 8 The Coppings Hoddesdon Hertfordshire EN11 9NJ offers help with ***Citadel, Crown Jewels, The Incredible Hulk, Sphinx Adventure, Gremlins.***

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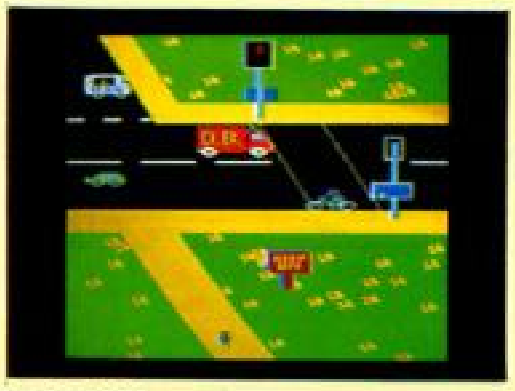
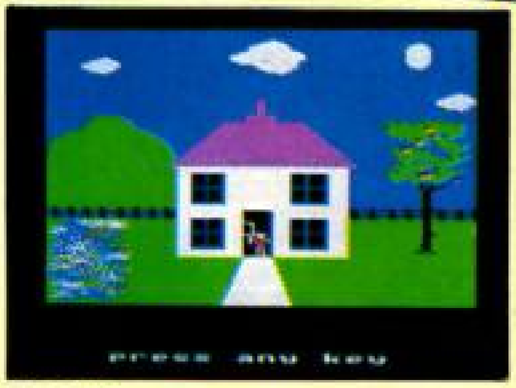
- Balance
- Castle
- Derrick
- Fred's Words
- Hilo
- Maths Test
- Mouser
- Number Signs
- Seawall
- Super Spell

Ages 8-12

- Anagram
- Codebreaker
- Dog Duck Corn
- Guessing
- Hangman
- Maths Hike
- Nim
- Odd Man Out
- Pelmanism
- Towers of Hanoi

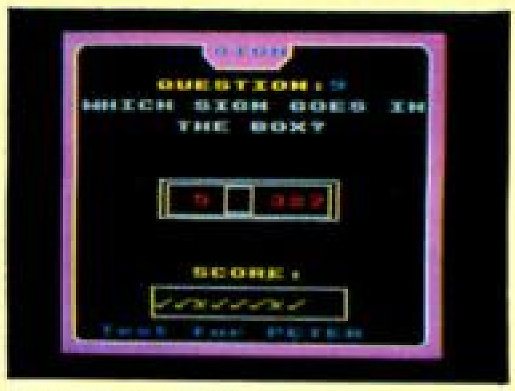


PELICAN
Teach your children to cross the road safely at a Pelican crossing



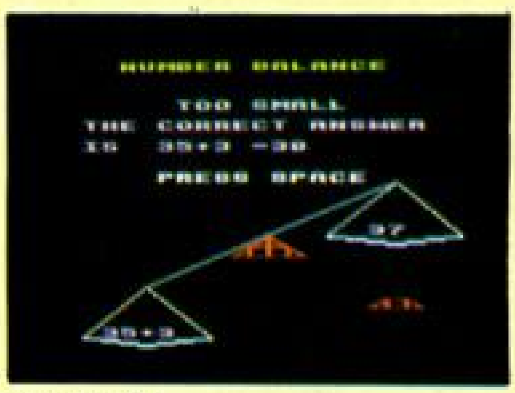
press any key

HOUSE
Select the colours to draw a house – hours of creative entertainment



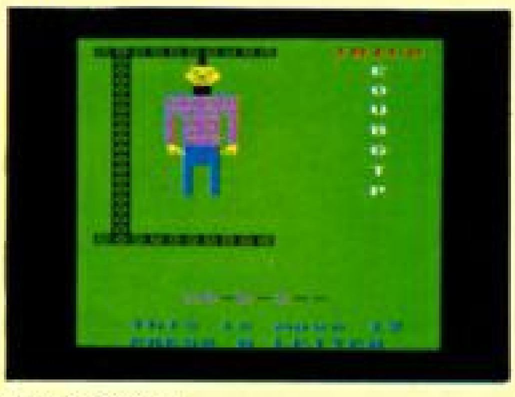
QUESTION: 5
WHICH SIGN GOES IN THE BOX?
SCORE:

NUMBER SIGNS
Provide the correct arithmetic sign and aim to score ten out of ten

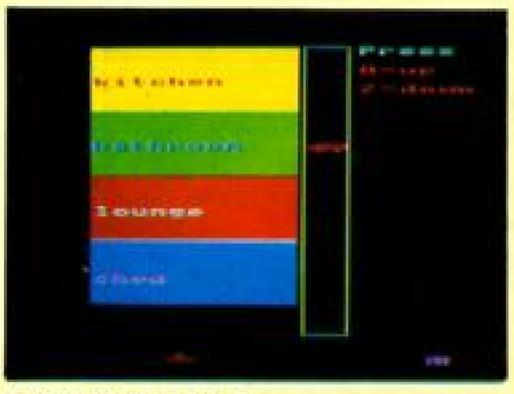


NUMBER BALANCE
TOO SMALL
THE CORRECT ANSWER IS 35+3 =38
PRESS SPACE

BALANCE
Learn maths the fun way. Type in the answer to balance the scales



HANGMAN
Improve your child's spelling with this fun version of the popular game



ODD MAN OUT
Find the word that does not fit – before your time runs out

TO ORDER TURN TO THE FORM ON PAGE 53

ADVERTISERS' INDEX

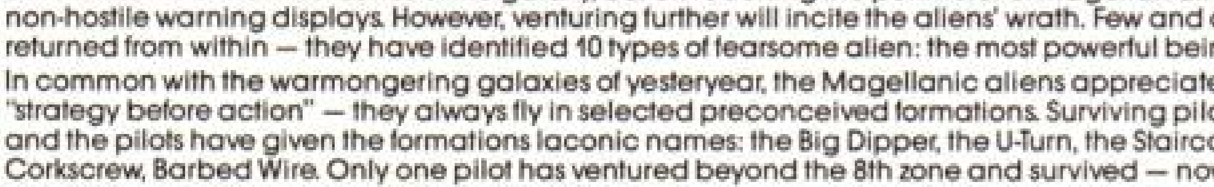
Kristin and Martin Hollis
The Magic Sword
The computer Adventure of Princess Poppy and the Frog Prince
A Database publication
Makes an ideal present
The Magic Sword
BBC Micro & Electron

Big Dipper formation

Crazy Funnel formation

The Deck of Cards

Acorn Electron version



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GALAFORCE for the BBC Micro, Master Series, and Acorn Electron

In the midst of the 25th century, the United Cosmological Federation declared war on the savage, belligerent aliens inhabiting the Magellanic galaxy. Only the most experienced of the U.C.F. pilots were chosen to embark upon the perilous mission of conquering and overthrowing the hordes of Magellan, the Galaforce.

Little is known of the inner zones of the galaxy, but on reaching the perimeter of Magellan all intruders are met with spectacular, non-hostile warning displays. However, venturing further will incite the aliens' wrath. Few and awestruck are the pilots who have returned from within — they have identified 10 types of fearsome alien: the most powerful being the scaly-skinned Calliston.

In common with the warmongering galaxies of yesteryear, the Magellanic aliens appreciate the maxims of "safety in numbers" and "strategy before action" — they always fly in selected preconceived formations. Surviving pilots have logged many such formations, and the pilots have given the formations laconic names: the Big Dipper, the U-Turn, the Staircase, Purple Rain, the Ski-Jump, the Corkscrew, Barbed Wire. Only one pilot has ventured beyond the 8th zone and survived — now retired from active service he relates stories of a perplexing formation which he named the Snaker.

The U.C.F. is now offering rewards to pilots for supreme acts of bravery within the Magellanic galaxy. Fast reflexes, trigger-happiness and a degree of calm cunning are required by all prospective pilots.

The game features include: 8-directional movement of the player's spaceship; fast and slow-speed bombs which home in when later zones are reached; keyboard and joystick control options; self-play demo mode; high-score tables; and superb atmospheric music.

PRICE: £9.95 (Cassette), £11.95 (BBC 5¼" disc), £14.95 (BBC Master Compact 3½" disc).

PRIZES PRIZES PRIZES PRIZES PRIZES PRIZES PRIZES PRIZES PRIZES PRIZES PRIZES PRIZES

To encourage pilots to venture forth further into Magellan, a substantial reward has been offered for the first pilots to cross the outer 48 zones of the galaxy. The successful competitors will be entered for a prize draw, the winner receiving a radio-controlled aeroplane worth £300. Two runners-up will each receive a £10 consolation prize and a trophy. Closing date: 31st March, 1987.

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